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PROVINCE OF BRITISH COLUMBIA

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SPECIAL REPORTS

ON

COAL-MINE EXPLOSIONS

note APPENDIX

TO THE

REPORT OF MINISTER OF MINES

FOR THE YEAR 1918

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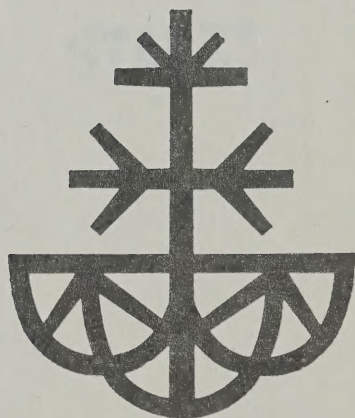


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Explosions at No. 3 Mine, Coal Creek

APRIL 5TH, 1917

5

SPECIAL REPORTS BY

| | | |
|-------------------|-------|-------------------------------|
| GEORGE WILKINSON, | - - - | Chief Inspector of Mines |
| THOMAS GRAHAM, | - - - | late Chief Inspector of Mines |
| JAMES ASHWORTH, | - - - | Consulting Engineer |

NOTE.—Each of these three Reports was accompanied by blue-prints taken from tracings of the company's mine-plans, to which certain notes had been added. As these three sets of prints were practically similar, only one set has been reproduced, and this applies to all three Reports.

EXPLOSION AT No. 3 MINE, COAL CREEK COLLIERY.

REPORT BY GEORGE WILKINSON, CHIEF INSPECTOR OF MINES.

I have the honour to submit the following report on the explosion which occurred on April 5th, 1917, in the No. 3 mine of the Coal Creek Colliery, operated by the Crow's Nest Pass Coal Company:—

Upon instructions from the Honourable the Minister of Mines, I left Victoria for Fernie on April 7th, 1917; leaving Victoria by 2 p.m. boat for Vancouver, arriving at Vancouver 7 p.m.; left Vancouver by Great Northern Railway via Settle, Spokane, and Wrexford, arriving at Fernie 10 a.m. Monday, April 9th.

Upon arrival at Fernie I visited the offices of the Crow's Nest Pass Coal Company in company with James Ashworth, who was appointed by the Honourable the Minister of Mines to investigate and report upon the explosion. At the office we met W. R. Wilson, general manager of the Crow's Nest Pass Coal Company, who kindly showed us the progress that had been made up to date with the recovery-work, marking the same upon a blue-print.

After consulting with Mr. Wilson I proceeded to Coal Creek and visited the mines and further checked up the progress of the recovery-work. I then consulted with Thomas Graham and Inspectors Strachan, Williams, and O'Brien about the future plan of operations on the recovery-work.

HISTORY OF RECOVERY-WORK.

Over four days having elapsed since the explosion had occurred, the following description of the work which had been done during that time is taken from the evidence of the witnesses at the inquest, and especially that of the mine manager, Mr. Caufield: Having been notified about the explosion about 10.20 p.m. on April 5th, Mr. Caufield hastened to the mine entrance and inquired as to the condition of the fan, receiving the reply from the fan engineer that it seemed to be carrying a heavy load and the water-gauge had fallen; the natural conclusion was that some of the separation doors had been destroyed. Inspection showed that those between Nos. 2 and 3 mines were all right, two being shut and the third being open; closing this, the party returned to the outside, and after ordering material in the shape of boards, nails, etc., to be brought forward, the party proceeded down No. 3 slope, the main haulage and intake airway.

About 50 feet inside the mine entrance they found the body of the pumpman, H. Melarky; leaving instructions for the body to be taken out, the party proceeded farther and found the separation doors between No. 3 mine intake and return blown out. These were rebuilt tempo-

rarily, and 500 feet farther a small fire was encountered in a crosscut to the left of the slope. After extinguishing this with water, two more small fires were discovered and extinguished in the same manner.

About this time Inspector of Mines T. H. Williams and John Biggs, overman of the No. 3 mine, arrived from Fernie, and they headed another exploration party, which travelled the parallel slope or travelling-way. Farther down the slope the separation doors leading to the pipe-lines were found to be destroyed, and it was necessary to erect a temporary stopping at this point.

In the meantime the other party headed by Inspector Williams had reached the foot of the slope and found three men, F. Benezeth, P. Gormly, and J. Machin. Benezeth, who was a miner, was from No. 2 room off No. 6 incline; Gormly was employed as conductor on the trips on the Main level; and Machin's regular employment was as a driver, but he was acting as rope-rider on the Main slope to the surface that afternoon. Benezeth was alive when found and was hurried out to the surface for medical attention, but succumbed four hours later without having regained consciousness.

Leaving the slope and proceeding in the level, the party encountered another fire, which had gained considerable headway, but after considerable work they were able to extinguish it. They then proceeded farther in when they were notified that another fire had been discovered in the crosscut inside of that in which the previous fire had been extinguished; therefore the party retreated and after considerable trouble got two other fires extinguished. About 1,000 feet from the foot of the slope the first big cave of rock was encountered, and, as it was evident that it would take some time to get over this, it was decided to arrange shifts so that the work could be carried forward as fast as possible. Arrangements were made for thirty men to work on each shift; included in this number were five officials who were acquainted with the workings.

By Monday, April 9th, the work had proceeded as far as No. 4 incline; stoppings had been erected to direct the air up No. 4 incline. There were no workmen up No. 4 incline, but it was not deemed advisable to work the rescue parties along the Main level with this large body of gas in this district in such a position that it might be forced out on the men by caves.

Very little progress was being made, and to take advantage of the large barrier pillar between the Main level and No. 1 room off No. 4 incline, and save the erection of about sixteen stoppings between the Main and counter levels, another stopping was built at the foot of No. 4 incline, which practically turned all the air coming into the mine into the No. 4 incline district. When this was completed, as it would take some time to clear out the gas from this district, the workmen were called off the inside work and sent to improve the temporary stoppings and secure the roof along the level at points where it was caved and over which it was difficult to travel.

During the day the body of the locomotive-driver was found at a point a little inside of the inside charging-station. He had been on the way in with an empty trip of cars when the explosion caught him, and, besides having several burns on his face and head, he was caught beneath a cave of rock which covered the entire trip of eighteen cars and the locomotive.

Tuesday, April 10th. The writer visited the mine with the party and made a thorough examination of all the accessible parts. Personnel of party: James Ashworth; Thos. Graham; B. Caulfield, manager of Coal Creek Colliery; Chas. Graham, manager of Michel Colliery; William Shaw, Inspector of Mines, Blairmore, Alberta; and Mine Inspectors Wilkinson, Williams, O'Brien, and Strachan, of the British Columbia staff, and Dudley Michel, Instructor in First-aid and Mine-rescue Work. The party were able to proceed to Nos. 3 and 4 inclines, but when at No. 2 stall off No. 4 incline were stopped by gas, the upper portion of these works being full. This proved that the air-current was not strong enough to overcome the resistance set up in the Nos. 4, 5, and 6 inclines, and it seemed impossible to move the gas in these places; and as this body of gas was going to be a standing menace to all operations being conducted inside, as the air was passing it before going inside, and any disturbance in the shape of a cave would force it out on the rescue party, it was the writer's opinion and the opinion of the party that the system of ventilation should be reversed, and this body of gas be put on the return side of the workmen instead of the intake; therefore it was decided after consultation to withdraw to the outside of the overcast on the level and make a break-through in it and reverse the air, so that the fresh air would travel along the counter-level inside of No. 4 incline and from there to No. 5 incline; both the Main and counter levels could be used for an intake, allowing the return air to go up No. 6 incline, down No. 5 incline, the crosscut to the rooms on No. 4 incline, and

after circulating around that district returning out the Main level and up Draper's slope and on to the fan.

This change requiring some time, on Wednesday, April 11th, the writer visited No. 1 East mine, where the "bumps" took place on November 7th and 8th, 1916; the personnel of the party being Thos. Graham; David Martin, overman of No. 1 East mine; and Inspectors Wilkinson, Williams, and Strachan.

Thursday, April 12th. Again visited No. 3 mine. Personnel of party: Thos. Graham, B. Caufield, Chas. Graham, Wm. Shaw, Inspectors Wilkinson, Williams, O'Brien, and Strachan, and Dudley Michel. After the change made in the ventilation on Tuesday we were able to penetrate into No. 6 incline district, getting into Nos. 1, 2, 3, and 4 rooms; in No. 2 room we could not get to within several feet of the face owing to gas, but had no difficulty in getting to the face of the others. During the night the bodies of W. R. Puckey, fireboss; William Bird and H. Falip, miners from No. 6 incline; W. Silverwood and T. Checkley, miners in a crosscut being driven from the level to No. 1 room off No. 6 incline, were found on the siding at the foot of No. 5 incline; all of these men were severely burned and had received other injuries also. The men in No. 1 room off No. 6 incline were also recovered during the night—viz., B. Giocomazzi and J. Falip; one of the two men out of No. 2 room off No. 6 incline, as stated before, was found at the foot of the slope, and up to date the body of his partner has not been recovered.

In No. 3 room the bodies of F. and J. Smith, father and son, were found by the above-mentioned party when examining the face of this room; they were found at the face and had evidently been at work when the explosion occurred, as J. Smith, from injuries received on his forehead, seemed to have been dashed against the face of the room; F. Smith was lying near by under some loose timber.

Owing to gas being present the party was unable to inspect the faces of Nos. 5 and 6 inclines.

Friday, April 13th. Personnel of party: James Ashworth, Thomas Graham, Chas. Graham, B. Caufield, Inspectors Wilkinson, Williams, O'Brien, and Strachan, and Dudley Michel. The party penetrated No. 5 room off No. 6 incline, 20 feet towards the face of No. 5 incline, No. 6 incline, and down No. 5 incline to crosscut of No. 5 incline to No. 1 room off No. 4 incline. During the night the bodies of J. Atkinson and H. Haydock were recovered from No. 5 room; they were found close to the face, both covered with rock. The bodies of J. Bossette and W. G. Clarke were also recovered from No. 5 incline, both being found back from the face down towards the crosscut, where they seemed to have been changing a car; both of these bodies were badly burned and crushed. The bodies of Ed. Coates and J. Campbell were found in the crosscut off No. 6 incline, both of them being buried with rock; the crosscut was caved, said cave extending right across No. 6 incline.

Saturday, April 14th. All lamps brought out of the mine were examined in the presence of the following: James Ashworth, Thomas Graham, George Wilkinson, T. H. Williams, George O'Brien, Chas. Graham, Robert Strachan, Robert Johnstone, electrician Crow's Nest Pass Coal Company, and Albert Fawcett, lampman at Coal Creek Colliery. A list showing condition of lamps is appended.

Monday, April 16th. The party visited return airways and old workings at the head of Draper's slope. Personnel of party: James Ashworth, Inspectors Wilkinson and Williams, Firebosses Jas. Bushell and Frank Lauder. The purpose of this examination was to determine what evidence there was of the explosion in the old workings or to find out if it had originated there. The examination showed there was no evidence of force in the old workings; the party then proceeded to the fan-drift, measured the air-current, and followed down the pipe-line road paralleling the Main No. 3 slope. The evidence showed the stoppings were all blown in from the slope, and James Bushell, the fireboss, stated the separation doors at the foot of the slope were blown in and up the slope near by a pillar-length.

Tuesday, April 17th. The party visited No. 6 incline district and got in the face of No. 5 incline. The bodies of John Monks and J. Stelliga were found in No. 4 room off No. 6 incline, 30 feet back from the face under a heavy cave. This completed the list of men working in this district, except the miner from No. 2 room, whose partner was found alive at the foot of the slope.

All work was then concentrated on reaching the face of the Main and counter levels; with this object in view a stopping was erected outside of No. 5 incline to drive the air down into

the counter-level and along to the face of the Main level and back and up No. 6 incline, and from there through No. 5 incline to No. 4. There being a swamp on the counter-level, it became necessary to build a bridge to allow of travelling the counter.

The counter-level was not heavily caved at this point, except at the foot of the crosscuts, until we reached the crosscut opposite the room or crosscut being driven from the Main level to room No. 1 off 6 incline. At this point it seemed an impossibility to get any farther; however, desperate attempts were made in various ways to penetrate farther by trying to get over or under the cave, and by taking a small slice of coal off the rib alongside of the cave. After four days of futile work it was decided in the interests of safety to abandon the advance work.

With this end in view a consultation was called, and it was decided to form a party containing members of all parties concerned to thoroughly examine the area explored and decide on future action; therefore W. R. Wilson, general manager of the Crow's Nest Pass Coal Company, and Thomas France, secretary of the local Gladstone Union, and William Hunter, president of the local Gladstone Union, joined the party.

On April 18th this party entered the mine and made thorough examination, and returned to the mine office for consultation, with the result that the following was drafted out and signed by all parties concerned:—

“NOTICE.

“COAL CREEK, April 18th, 1917.

“After making an examination of all the existing conditions of the Main level and Main parallel level in No. 3 mine, between the foot of the slope parting and to heavy clod falls in both Main level and counter-level, which we found at points about 600 feet on the inside of No. 6 incline, we are of the opinion that the only safe and practical method of recovering the bodies yet entombed between No. 6 parting and the faces of the Main levels is to push the cleaning-up of main tunnels from the outer end, where the main haulage is available, concentrating all labour through this more safe method until the bodies are all recovered.

“(Signed.) GEORGE WILKINSON.

WILLIAM HUNTER.

“THOS. GRAHAM.

CHAS. GRAHAM.

“ROBERT STRACHAN.

B. CAUFIELD.

“T. H. WILLIAMS.

JAMES ASHWORTH.

“GEORGE O'BRIEN.

W. R. WILSON.”

“THOMAS FRANCE.

SHORT DESCRIPTION OF NO. 3 MINE.

No. 3 slopes are driven due east approximately 1,500 feet; at the foot of the slopes a pair of levels are driven on the strike of the seam for approximately 8,500 feet. Nos. 1, 2, 3, and 4 inclines are turned from these levels at a point 4,500 feet distant from the bottom of the slope. The inclines are driven on a bearing of S. 45° W. for a distance of approximately 2,000 feet. Off these inclines six rooms are driven, in sets of three, for approximately 1,000 feet. At a distance of approximately 5,700 feet from the bottom of the slope, Nos. 5 and 6 inclines are driven on a bearing of due west for a distance of 700 feet and rooms turned off in sets of three. The first three are in a distance of approximately 200 feet, and two of the second set are turned away and in about 50 feet. Inside of Nos. 5 and 6 inclines a distance of 500 feet two rooms are turned away from the level and are up about 75 feet. The faces of the levels are about 800 feet inside of these two rooms.

The levels are driven 10 feet wide, with 50 to 60 feet of pillars between. The rooms are driven 18 feet wide, with 60-foot centres, and a pillar of 150 feet is left between each set of rooms.

The seam averages about 5½ feet in thickness; brushing of about 4 feet is taken up to make height. There is a band of coal in the brushing which runs from nothing to 4 feet.

The ventilation of the mine is produced by a Wilson fan, size 8 x 16 feet, driven by rope-drive from a steam-engine 16 x 18 inches geared 5 to 8, running at a speed of approximately 35 revolutions a minute with a water-gauge of 3½ inches. A spare engine is kept ready for use.

THE APPARENT CONDITION OF THE MINE BEFORE THE EXPLOSION.

To give this, the following reports are appended:—

(a.) Firebosses' daily reports from March 1st, 1917, to date of explosion.

(b.) Overman's daily reports from March 1st, 1917, to date of explosion.

- (c.) Gas Committee reports for January, February, and March, 1917.
- (d.) Inspector of Mines' reports for January, February, and March, 1917.
- (e.) Samples of mine-air taken in No. 3 mine, Coal Creek.
- (f.) Air-measurements taken by Inspectors of Mines.

COPY OF FIREBOSSSES' REPORTS ON NO. 3 MINE, COAL CREEK COLLIERY, FROM MARCH 1ST TO APRIL 5TH, 1917.

Date: March 1st. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas; all places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 1st. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 1st. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found same free from explosive gas and in a safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 2nd. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas; all places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 2nd. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from level round to counter-level.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 2nd. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found same free from explosive gas and in safe condition. A small cap of gas in return air from Main level round to counter-level.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 3rd. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas from Main level round to counter-level in return air.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 3rd. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from Main level round to counter-level.

J. B.; W. R. PUCKEY.

Date: March 3rd. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: All persons being out of the mine and no shift coming on, I have securely fenced off entrances.

J. B.; W. R. PUCKEY.

Date: March 4th. Time: 8.15 p.m.

Barometer: 26 inches. Thermometer: 32° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have removed fences to examine main roads. Fan started 7 p.m.

J. B.; W. R. PUCKEY.

Date: March 4th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from Main level round to counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 5th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 5th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Barometer: 25.9 inches. Thermometer: 42° Fahr.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 5th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in air from Main level round to counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 6th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level to counter-level; all other places clear and in a safe condition.

J. B.; J. McCOURT.

Date: March 6th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas. A small cap of gas in return air from Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 6th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in the return air from Main level round to counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 7th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 7th. Time: 3 p.m.

Barometer: 26.2 inches. Thermometer: 40° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 7th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in air from Main level round to counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 8th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 8th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 8th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from Main level round to the counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 9th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 9th. Time: 3 p.m.

Barometer: 26.1 inches. Thermometer: 30° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level to face of counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 9th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.
A small cap of gas in return air from Main level round to counter-level.

J. McCourt; J. B.; W. R. Puckey.

Date: March 10th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. Thompson; J. B.; J. McCourt.

Date: March 10th. Time: 2.30 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas from face of Main level to counter-level; all other places clear and in a safe condition.

W. R. Puckey; J. B.; J. Thompson.

Date: March 10th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.
A small cap of gas in return air from face of Main level round to counter-level.

J. B.; W. R. Puckey.

Date: March 10th. Time: 11 p.m.

Remarks: All persons being out of the mine, I have securely fenced off both entrances.

J. Thompson; J. B.; W. R. Puckey.

Date: March 11th. Time: 5.50 p.m.

Remarks: Removed fences to examine main roads to pumps and mine.

J. B.; J. Thompson.

Date: March 11th. Time: 10 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and main roads to pumps and found same free from explosive gas and in a safe condition.

J. McCourt; J. B.; J. Thompson.

Date: March 12th. Time: 7 a.m.

Barometer: 26.1 inches. Temperature: 22° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas; all places clear and in a safe condition.

W. R. Puckey; J. McCourt.

Date: March 12th. Time: 2.45 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.
A small cap of gas in return air from Main level round to counter-level.

J. Thompson; J. B.; W. R. Puckey.

Date: March 12th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found same free from explosive gas and in a safe condition.
A small cap of gas in return air from face of Main level round to counter-level.

J. McCourt; J. B.; J. Thompson.

Date: March 13th. Time: 7 a.m.

Barometer: 26.1 inches. Temperature: 22° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level round to counter-level; all other places clear and in a safe condition.

W. R. Puckey; J. B.; J. McCourt.

Date: March 13th. Time: 2.45 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.
A small cap of gas in return air from Main level round to counter-level.

J. Thompson; J. B.; W. R. Puckey.

Date: March 13th. Time: 10.15 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition.

J. McCourt; J. B.; J. Thompson.

Date: March 14th. Time: 7 a.m.

Barometer: 26.1 inches. Temperature: 18° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

A small cap of gas in return air from Main level round to counter-level.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 14th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

A small cap of gas in return air from Main level round to counter-level.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 14th. Time: 10.50 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level to counter-level; all other places clear and in safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 15th. Time: 7 a.m.

Barometer: 26.2 inches. Temperature: 12° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 15th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it clear from explosive gas and in a safe condition.

A small cap of gas in return air from Main level round to counter-level.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 15th. Time: 10.50 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level to counter-level; all other places clear and in safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 16th. Time: 7 a.m.

Barometer: 26.3 inches. Temperature: 12° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 16th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 16th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a cap of gas in return air from face of Main level to counter-level; all other places clear and in safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 17th. Time: 7 a.m.

Barometer: 26.4 inches. Temperature: 18° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 17th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a little gas in return air from Main level to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 17th. Time: 10.20 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a cap of gas in return air from Main level to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 17th. Time: 10.20 p.m.

Remarks: All men being out of mine, I fenced off both entrances to same.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 18th. Time: 5.30 p.m.

Barometer: 26.1 inches. Thermometer: 34° Fahr.

Remarks: I have removed fences to examine main roads to pump.

J. B.; W. R. PUCKEY.

Date: March 18th. Time: 7.30 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined the main roads leading to the pumps and found them free from explosive gas and in a safe condition.

J. B.; W. R. PUCKEY.

Date: March 18th. Time: 10.30 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from Main level round to counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 19th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in face of Main level round to counter-level; all other places clear and in safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 19th. Time: 3 p.m.

Barometer: 26.1 inches. Temperature: 34° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas from face of Main level to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 19th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from Main level to counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 20th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 20th. Time: 3 p.m.

Barometer: 26 inches. Thermometer: 36° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level round to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 20th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from Main level round to counter-level.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 21st. Time: 7 a.m.

Barometer: 25.9 inches. Thermometer: 38° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 21st. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a cap of gas in face of Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. THOMPSON.

Date: March 21st. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in face of Main level round to counter-level; all other places clear and in a safe condition.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 22nd. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 22nd. Time: 3 p.m.

Barometer: 25.9 inches. Temperature: 38° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a cap of gas from face of Main level round to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 22nd. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from the face of Main level round to counter-level; all other places clear and in a safe condition.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 23rd. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 23rd. Time: 3 p.m.

Barometer: 25.6 inches. Temperature: 34° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas from face of Main level round to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 23rd. Time: 10.30 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from Main level round to counter-level; all other places clear and in a safe condition.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: March 24th. Time: 7 a.m.

Roof and sides: Safe, except a small cave on main road. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: March 24th. Time: 3 p.m.

Barometer: 25.8 inches. Temperature: 34° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a cap of gas from face of Main level round to counter-level; all other places clear and in safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: March 24th. Time: 10.30 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in air from Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 24th. Time: 11 p.m.

Remarks: All persons being out of the mine, I have securely fenced off both entrances.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 25th. Time: 6 p.m.

Remarks: Removed fences to examine mine and main roads to pumps.

J. B.; J. THOMPSON.

Date: March 25th. Time: 10 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found same free from explosive gas and in safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 26th. Time: 7 a.m.

Barometer: 26.3 inches. Thermometer: 10° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 26th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition. A small cap of gas in return air from Main level round to counter-level.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 26th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a cap of gas from face of Main level round to counter-level; all other places clear and in a safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 27th. Time: 7 a.m.

Barometer: 26.1 inches. Thermometer: 28° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in the return air from face of Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 27th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 27th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas from face of Main level round to counter-level; all other places clear and in safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 28th. Time: 7 a.m.

Barometer: 26.1 inches. Thermometer: 22° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 28th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 28th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 29th. Time: 7 a.m.

Barometer: 25.9 inches. Temperature: 32° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas from face of Main level round to counter-level in return air; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 29th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas from face of Main level round to counter-level in return air; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 29th. Time: 10.30 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 30th. Time: 7 a.m.

Barometer: 25.9 inches. Thermometer: 22° Fahr.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in the return air from face of Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 30th. Time: 3 p.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found a small cap of gas in the return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 30th. Time: 10.30 p.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. McCOURT; J. B.; J. THOMPSON.

Date: March 31st. Time: 7 a.m.
Barometer: 26 inches. Temperature: 24° Fahr.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found a small cap of gas in the return air from face of Main level round to counter-level; all other places clear and in a safe condition.

W. R. PUCKEY; J. B.; J. McCOURT.

Date: March 31st. Time: 3 p.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found a small cap of gas in the return air from face of Main level round to counter-level; all other places clear and in a safe condition.

J. THOMPSON; J. B.; W. R. PUCKEY.

Date: March 31st. Time: 3.20 p.m.
Remarks: All men being out of the mine; I securely fenced off both entrances.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: April 1st. Time: 6 p.m.
Remarks: I have removed fences to examine main roads to pumps.

J. B.; W. R. PUCKEY.

Date: April 1st. Time: 7.30 p.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined main roads and found them free from explosive gas and in a safe condition.

J. B.; W. R. PUCKEY.

Date: April 1st. Time: 10 p.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: April 2nd. Time: 7 a.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found it free from explosive gas; all places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: April 2nd. Time: 2.50 p.m.
Barometer: 26.1 inches. Thermometer: 42° Fahr.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found same free from explosive gas and in a safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: April 2nd. Time: 11 p.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found it free from explosive gas and in a safe working condition.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: April 3rd. Time: 7 a.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found it free from explosive gas; all places clear and in a safe condition.

J. THOMPSON; J. B.; J. McCOURT.

Date: April 3rd. Time: 2.45 p.m.
Barometer: 26.3 inches. Thermometer: 42° Fahr.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

W. R. PUCKEY; J. B.; J. THOMPSON.

Date: April 3rd. Time: 10.30 p.m.
Roof and sides: Safe. Ventilation: Good.
Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

J. McCOURT; J. B.; W. R. PUCKEY.

Date: April 4th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

J. B.; J. McCourt.

Date: April 4th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition.

W. R. Puckey; J. B.; J. Thompson.

Date: April 4th. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a little gas in crosscut off counter-level; all other places clear and in a safe condition.

J. McCourt; J. B.; W. R. Puckey.

Date: April 5th. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a little gas in crosscut off counter-level; all other places clear and in a safe condition.

J. Thompson; J. B.; J. McCourt.

Date: April 5th. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of crosscut to face of counter-level; all other places clear and in safe condition.

W. R. Puckey; J. B.; J. Thompson.

OVERMAN'S REPORTS ON NO. 3 MINE, COAL CREEK COLLIERY, FROM MARCH 1ST UNTIL
APRIL 5TH, 1917.

March 1st, 1917. I have examined No. 3 mine and found same free from explosive gas and in a safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 53.

J. Biggs.

March 2nd, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 100.

J. Biggs.

March 3rd, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 103.

J. Biggs.

March 4th, 1917. Sunday, mine idle. The mine was fenced off from 3 p.m. on Saturday until 7 p.m. on Sunday. Afternoon-shift fireboss reports No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 4.

J. Biggs.

March 5th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 62.

J. Biggs.

March 6th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. There is a small cap of gas in the return airway. Number of men in mine, 97.

J. Biggs.

March 7th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 97.

J. Biggs.

March 8th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. There is a small cap of gas in the air on the return airway. Firebosses report No. 3 mine as stated above. Number of men in mine, 97.

J. Biggs.

March 9th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. The Inspector made his usual examination and found the above-mentioned conditions. Firebosses report No. 3 mine as stated above. Number of men in mine, 100.

J. Biggs.

March 10th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 99.

J. Biggs.

March 11th, 1917. Sunday, mine idle. The mine was fenced off from 11 p.m. on Saturday until 5.50 p.m. on Sunday. Afternoon-shift fireboss reports No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 4.

J. BIGGS.

March 12th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 95.

J. BIGGS.

March 13th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 101.

J. BIGGS.

March 14th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 29.

J. BIGGS.

March 15th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 100.

J. BIGGS.

March 16th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 100.

J. BIGGS.

March 17th, 1917. I have examined No. 3 mine and found a little gas in crosscut off counter-level; other places clear and in safe condition. Firebosses report No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 98.

J. BIGGS.

March 18th, 1917. Sunday, mine idle. The mine was fenced off from 11 p.m. on Saturday until 5.30 p.m. on Sunday. Afternoon-shift fireboss reports No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 8.

J. BIGGS.

March 19th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 58.

J. BIGGS.

March 20th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 95.

J. BIGGS.

March 21st, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 98.

J. BIGGS.

March 22nd, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. There is a small cap of gas in return airway. Firebosses report No. 3 mine as stated above. Number of men in mine, 96.

J. BIGGS.

March 23rd, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 99.

J. BIGGS.

March 24th, 1917. I have examined the main roads of No. 3 mine and found same in safe condition. Firebosses report No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 97.

J. BIGGS.

March 25th, 1917. Sunday, mine idle. The mine was fenced off from 11 p.m. on Saturday until 5.30 p.m. on Sunday. Afternoon-shift fireboss reports No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 4.

J. BIGGS.

March 26th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 64.

J. BIGGS.

March 27th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 91.

J. BIGGS.

March 28th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 91.

J. BIGGS.

March 29th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 91.

J. BIGGS.

March 30th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 51.

J. BIGGS.

March 31st, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 92.

J. BIGGS.

April 1st, 1917. Sunday, mine idle. The mine was fenced off from 3.30 p.m. on Saturday until 6 p.m. on Sunday. Afternoon-shift fireboss reports No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 4.

J. BIGGS.

April 2nd, 1917. I have examined the main roads and found same in safe condition. Firebosses report No. 3 mine free from explosive gas and in safe condition. Number of men in mine, 30.

J. BIGGS.

April 3rd, 1917. I have examined No. 3 mine and found same free from explosive gas and in same condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 81.

J. BIGGS.

April 4th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Number of men in mine, 90.

J. BIGGS.

April 5th, 1917. I have examined No. 3 mine and found same free from explosive gas and in safe condition. The Inspector made his usual examination of the mine to-day and found the above-mentioned conditions. Afternoon- and night-shift firebosses report a little gas in crosscut off counter-level; day-shift fireboss reports all clear. Number of men in mine, 94.

J. BIGGS.

REPORTS OF GAS COMMITTEE OF NO. 3 MINE, COAL CREEK COLLIERY, FOR THE MONTHS OF JANUARY, FEBRUARY, AND MARCH, 1917.

January 6th, 1917:

We, the undersigned, have this day examined the whole of No. 3 mine and find gas in 5 incline. All other places clear of explosive gas. Timber, roof, and sides good.

(Signed.) WM. BIRD.
JNO. CHARNOCK.

February 17th, 1917.

We, the undersigned, have this day examined the whole of No. 3 mine and find a small cap of gas in 3 room off 4 incline, also gas in crosscut off South-slope, same fenced off. Timber, roof, and sides good.

(Signed.) WM. BIRD.
JNO. CHARNOCK.

March 17th, 1917.

We, the undersigned, have this day examined the whole of No. 3 mine and find gas in crosscut off counter. All other places clear. Timber, roof, and sides good.

(Signed.) WM. BIRD.
JNO. CHARNOCK.

INSPECTORS OF MINES' REPORTS FOR JANUARY, FEBRUARY, AND MARCH, 1917.

I hereby give notice that I have this day examined the underground workings of that part of the Crow's Nest Pass Coal Company's Colliery known as Coal Creek No 3 mine, and find the following conditions to prevail therein:—

Part of mine examined: Mine. Ventilation: Good.

Explosive gas: None. Small cap of gas in the last places on the air and in the return airway.

Roadways: Good. Timbering: Good.

Remarks: I measured 32,000 cubic feet of air a minute for the use of forty-four men and eight horses.

Dated at Coal Creek, B.C., this 9th day of January, 1917.

T. H. WILLIAMS,
Inspector of Mines.

I hereby give notice that I have this day examined the underground workings of that part of the Crow's Nest Pass Coal Company's Colliery known as Coal Creek No 3 mine, and find the following conditions to prevail therein:—

Part of mine examined: All the mine. Ventilation: Poor at the face of the South level, but generally good throughout the rest of the mine.

Explosive gas: Face of South level, crosscut off South level, and counter to South level. These three places were fenced off and the men withdrawn.

Roadways: Good, but the South level haulage-road is dusty in places. Timbering: Good.

Remarks: I measured 35,000 cubic feet of air a minute on the main intake for the use of forty-three men and eight horses. This quantity is divided into two shifts: South level split, 25,500 cubic feet a minute for forty men and eight horses; and for the Slope split I measured 6,000 cubic feet a minute for three men and one horse.

Dated at Coal Creek, B.C., this 8th day of February, 1917.

GEORGE O'BRIEN,
Inspector of Mines.

I hereby give notice that I have this day examined the underground workings of that part of the Crow's Nest Pass Coal Company's Colliery known as Coal Creek No 3 mine, and find the following conditions to prevail therein:—

Part of mine examined: Mine. Ventilation: Good.

Explosive gas: None.

Roadways: Good. Timbering: -Good.

Remarks: I measured 35,000 cubic feet of air a minute for the use of forty-three men and seven horses. There is a small cap of gas in the Main level and counter.

Dated at Coal Creek, B.C., this 9th day of March, 1917.

T. H. WILLIAMS,
Inspector of Mines.

I hereby give notice that I have this day examined the underground workings of that part of the Crow's Nest Pass Coal Company's Colliery known as Coal Creek No 3 mine, and find the following conditions to prevail therein:—

Part of mine examined: Mine. Ventilation: Good.

Explosive gas: None. There was half-inch cap in the Main level, counter-level, and crosscut off it.

Roadways: Good. Timbering: Good.

Remarks: I measured 29,250 cubic feet of air a minute for the use of forty-three men and seven horses.

Dated at Coal Creek, B.C., this 5th day of April, 1917.

T. H. WILLIAMS,
Inspector of Mines.

MINE-AIR SAMPLES TAKEN IN NO. 3 MINE, COAL CREEK COLLIERY, MARCH 23RD, 1917.

Sample No. 90, taken by T. H. Williams on South level, 150 feet on the return side of the last working-place:—

| Chemical Analysis. | | Technical Analysis. | |
|----------------------|-----------|---------------------|-----------|
| | Per Cent. | | Per Cent. |
| Carbon dioxide | 0.38 | Air | 94.94 |
| Oxygen | 19.87 | Fire-damp | 3.43 |
| Methane | 3.43 | Black-damp | 1.63 |
| Nitrogen | 76.32 | | |

Sample No. 91, taken by T. H. Williams on the Main return, 100 feet from the fan:—

| Chemical Analysis. | | Technical Analysis. | |
|----------------------|-----------|---------------------|-----------|
| | Per Cent. | | Per Cent. |
| Carbon dioxide | 0.34 | Air | 95.94 |
| Oxygen | 20.08 | Fire-damp | 1.28 |
| Methane | 1.28 | Black-damp | 2.78 |
| Nitrogen | 78.30 | | |

Sample No. 92, taken by T. H. Williams on the Main level, about 500 feet from the face, but did not include the three last places on the air:—

| Chemical Analysis. | | Technical Analysis. | |
|----------------------|-----------|---------------------|-----------|
| | Per Cent. | | Per Cent. |
| Carbon dioxide | 0.23 | Air | 96.66 |
| Oxygen | 20.23 | Fire-damp | 1.99 |
| Methane | 1.99 | Black-damp | 1.35 |
| Nitrogen | 77.55 | | |

Average of eight samples taken when mine was working:—

| | Per Cent. | | Per Cent. |
|-----------------------|-----------|-----------------------|-----------|
| CO ₂ | 0.14 | CH ₄ | 1.77 |
| O | 20.44 | N | 77.69 |

Average of seven samples taken when mine was idle:—

| | Per Cent. | | Per Cent. |
|-----------------------|-----------|-----------------------|-----------|
| CO ₂ | 0.11 | CH ₄ | 1.38 |
| O | 20.53 | N | 77.97 |

CONDITION OF MINE AFTER EXPLOSION.

The mine was in a badly wrecked condition after reaching a point along the level 1,000 feet from the bottom of the slope; outside from this point the mine was not very much damaged. There are several long and extensive caves along the Main and counter levels, also up the inclines and in the places. It will take a long time to reopen the mine.

The following is from a detailed examination of the mine: Proceeding down the slope from the entrance very little damage is found; some of the stoppings were blown out and separation doors injured. Slight caves of rock had occurred here and there, but were of no consequence, until the first large cave was encountered 1,000 feet along the Main level. This cave extended for about 400 feet; proceeding about 300 feet farther, another cave is encountered which extends for about 700 feet. About 600 feet farther on, another cave is encountered which is practically continuous to the large cave on the level which stopped operations on the advance recovery-work; this is a distance of approximately 3,600 feet. All the inclines and working-places are caved more or less the whole distance.

A detailed examination of the working-places as far as examined showed the following conditions:—

Room No. 1 off No. 6 Incline.—Heavily caved to within a few feet of the face. Coal very soft at face; no signs of coking; large deposits of soot and dust. The men were not working in this place, but were driving a crosscut up to No. 2 room. Two crosscuts had been driven from this room to No. 2 room. Line of force in this room was in from incline and up inside crosscut into No. 2 room.

Crosscut off No. 1 Room.—Heavily caved to within a few feet of the face. Coal hard; no signs of coking deposits of soot and dust.

Room No. 2 off No. 6 Incline.—Heavily caved to within a few feet of the face. Rock nearly 70 feet long in one piece; could not quite reach the face of this room. No signs of coking as far as was reached. Line of force right up this crosscut and out of No. 3 room.

Room No. 3 off No. 6 Incline.—Timbers all blown out by force of explosion, but not much rock fallen. A little sign of coking in this place. The bodies of J. and F. Smith, father and son, were found in this place at the face. They had evidently been working when the explosion occurred. This room was about 15 feet past the last crosscut from No. 2 room and had not suffered much damage at the face from the force of the explosion. The force from the explosion had come up the crosscut from the room below and had gone outwards.

Room No. 4 off No. 6 Incline.—Very heavily caved to within a few feet of the face. Coal very soft at the face; small signs of coking. The bodies of J. Stelliga and J. Monks were found 30 feet back from the face under a cave. These men had apparently finished work for the shift and were in the act of putting their tools away. A tool-rack was found just at this point.

Room No. 5 off No. 6 Incline.—Very heavily caved to within a few feet of the face. Coal very soft; no coking; small deposits of soot. The bodies of H. Haydock and Jos. Atkinson were found right at the face—Atkinson on the right side of the room and Haydock on the left. Shovel found right at the face looks as if they had been caught while working at the face.

No. 6 Incline.—Coal hard at the face. Timbers knocked out, but place not caved. Not much signs of force, more compression; no coking; small deposits of soot. Incline face is 50 feet above crosscut in course of being driven to No. 5 incline. The men from this place, William Bird and H. Falip, were found at the foot of No. 5 incline and had evidently finished work and were on their way out.

Crosscut to Right off No. 6 Incline.—Heavily caved to within 5 feet of the face; no coking; small deposits of soot. The bodies of J. Campbell and Ed. Coates were found in this place. Campbell was found 10 feet from the face and 6 feet from the low rib, lying with his head pointing to the top rib. Coates was found leaning over a car at the face, with cave of rock on top of him, as if he had been in the act of loading a car. The crosscut is in 20 feet; coal $5\frac{1}{2}$ feet high, with a brushing of 3 feet.

Last Break-through from No. 6 to No. 5 Incline.—Evidence of coking on timbers in this crosscut. Empty car found at corner of crosscut at point on No. 5 incline. This car had been broken by confliction of forces; one end had been driven upward to the face of the incline, and the other end outward and down the crosscut. The body of W. G. Clarke was found 10 feet from the car up the incline lying on his back, head pointing down. The body of J. Bossetti was found a little farther up, with his head pointing towards the face.

No. 5 Incline.—Face of this place was found in a normal condition, with the exception of timber knocked out by force of the explosion; no coking; deposits of soot. This was the only place in the mine where there was any conflicting lines of force of the explosion. This can be accounted for by the fact of the incline being driven ahead of the rooms forming a cul-de-sac. The force coming up the rooms and No. 6 incline had partly split, and part broke through the crosscuts into No. 5 incline and direct to No. 4 incline district. The other part reached the face and made a swirling movement and came back down No. 5 incline to the last break-through to No. 4 incline district. These working-places were all that were accessible; the places yet to be explored are the Main and counter levels and crosscut between them, and room No. 1 off the Main level. These places are inside of the heavy caves which stopped the exploration-work.

LINE OF FORCE FROM EXPLOSIVE BLAST.

All lines of force point from the level outwards, the blast coming out of the Main level, split at the foot of No. 6 incline, part going up No. 6 incline; the part split again at room No. 1 off No. 6 incline, part of which went up the incline and part into No. 1 room, up crosscut and into No. 2 room, up crosscut to No. 3 room, out of No. 3 room, and going again on No. 6 incline into Nos. 4 and 5 rooms and No. 6 incline; part of this force broke the stoppings between Nos. 5 and 6 inclines and passed direct through to No. 4 incline district; the other part that went into Nos. 5 and 6 inclines made conflicting lines of force, but eventually joined up with the forces going into No. 4 incline district. Nos. 5 and 6 inclines and rooms Nos. 4 and 5 being practically blind ends or cul-de-sac, conflicting lines of force could be expected at this point. The forces going through No. 4 incline district came back on the Main level and were outwards from that point. All lines of force on the counter-level were outward, going up crosscuts at some places on to the Main level.

DEDUCTIONS AS TO INITIAL POINT OF EXPLOSION.

The lines of force as found in the mine seem to indicate without any doubt that the point of origin was somewhere inside of No. 6 incline. Inside of this point there are yet four working-places to be explored and twelve bodies to be recovered. As to where inside of this point the explosion originated it is premature as yet to decide; but, personally, I am inclined to think there was a primary explosion of fire-damp within this area which was propagated through the mine by the agency of coal-dust.

A short review of the conditions existing inside of this point will also support this theory. From March 1st, 1917, to 3 p.m. April 5th, the day of the explosion, there were ninety-six fire-bosses' reports entered in the book, and on eighty of these gas was reported. This was reported mostly as a cap of gas in return air from face of level to face of counter-level. From evidence brought out by witnesses at the inquest it was proved this was from $\frac{1}{2}$ - to $\frac{3}{4}$ -inch gas-cap. This practically means that there was almost continuous from March 1st to April 5th from 2 to $2\frac{1}{2}$ per cent. of methane in the current of air passing through the Main and counter levels. This is also supported by the Gas Committee report of March 17th, 1917; they report finding gas in crosscut of counter-level.

Inspector Williams's report that morning states he found a $\frac{1}{2}$ -inch gas-cap in Main level, counter-level, and crosscut off it. Inspector Williams's report of March 9th also states he found a small cap of gas in the Main level and counter-level.

Inspector O'Brien's report on February 8th states the ventilation poor at the face of the South level, and he found explosive gas in the faces of South level crosscut off South level and counter South level; and again on January 9th Inspector Williams reports that small cap of gas in the last places on the return air and in the return air, which is the same level.

Taking the analysis of the air samples from this mine taken on March 23rd, 1917: Sample taken 150 feet on the return side of last working-place contained 3.43 per cent. of methane; quantity passing, 13,000 cubic feet a minute. Sample taken 500 feet from face of Main level contained 1.99 per cent. methane; quantity passing, 17,600 cubic feet a minute. Sample taken 100 feet from fan contained 1.28 per cent. of methane; quantity passing, 53,000 cubic feet a minute. An average of eight samples taken from this mine when working showed 1.77 per cent. of methane in the current passing, and the mine was giving off 3,669 cubic feet of methane to the ton of coal mined.

Again, an average of seven samples taken when the mine was idle showed 1.38 per cent. of methane in the current passing. From this it will be seen the mine was a gassy one, and the weakest place in the ventilation was the face of the Main and counter levels and crosscut of the same.

We have conditions under which explosive gas has been found at the face of the levels as given in Inspector O'Brien's report. Referring again to the samples of gas taken on March 23rd, the one taken 150 feet on the return side of the last working-place showed 3.43 per cent.; when we consider that methane becomes inflammable at 5.5 per cent., this is getting near the danger-line.

Mr. Williams stated in his evidence at the inquest that this sample was taken under abnormal conditions, as there had been a curtain broken down; but, apart from this, we have the current of 17,600, which is the intake to these levels, on the same date, containing 1.99 per cent. of methane. From the evidence taken at the inquest on the condition of the mine the shift preceding the explosion, witness No. 5, Joseph Lane, who worked in the Main level, swore that on the morning of April 5th, when he went into his place, there was a $\frac{1}{2}$ -inch gas-cap in it, and this gradually increased to $\frac{3}{4}$ inch at the end of the shift; he also stated that this was no unusual condition since the double shift was put on. (The double shift was put on to place the men thrown out of work by the "bump" in No. 1 East mine last November.) He also admitted that Inspector O'Brien had withdrawn him owing to there being a 1-inch cap of gas in the air. Lane, who is an old experienced miner, has worked for many years as fireboss, also holding a second-class certificate of competency, did not report this condition either to the fireboss or any of the officials, although he claimed the condition was worse when he left the place and after the fireboss had made his inspection.

R. Doodson, bratticeman, claimed he went into the Main level that morning and found a small cap of gas about $\frac{1}{2}$ inch, and in an hour had reduced it below $\frac{1}{2}$ inch by fixing the brattice.

J. McCourt, fireboss on the night shift, gave evidence that he found a small cap of gas in the crosscut off the counter-level, which he reported.

John Biggs, overman of No. 3 mine, testified he had held a second-class Certificate for eight years, had worked in No. 3 mine for seven years and ten months, and was overman for the past two years and five months. On the 5th instant he found the conditions very good; had found gas in one part of the mine varying to $\frac{1}{2}$ -inch cap. Did not consider it a dusty mine, and had never had occasion to withhold the men for dangerous conditions. His opinion was that something out of the ordinary happened, as there was only the usual quantity of dust and gas present on the 5th. They had only small "bumps" in this mine. Replying to Mr. Lane's statement about the gas-cap increasing from $\frac{1}{2}$ to $\frac{3}{4}$ inches, he claimed that he visited that place on the afternoon and examined for gas and only found $\frac{1}{2}$ -inch gas-cap. He admitted he did not report caps of gas until it was suggested by Inspector Williams that he should do so.

Replying to Chief Inspector Wilkinson, he said a broken lamp had been found in the mine several weeks ago and miners had been found with matches in their possession.

Jos. Thompson, fireboss on day shift of No. 3 mine, was on duty on the morning of explosion; had nineteen years' experience as miner; held third-class certificate of competency for eight years; had been fireboss in No. 3 mine for past six months. He thought the general conditions

in the mine that day were fairly good. Was in Main level about 1.30 p.m. that day and did not consider conditions were any worse than they had been during the day; had found a small cap of explosive gas near the roof. He considered everything was in normal condition when he left the mine that day.

B. Caufield, manager, Coal Creek Colliery, had twenty-seven years' experience as a miner. Holds first-class certificate of competency for British Columbia for past seven years; has been three years manager at Coal Creek; testified that he generally found the conditions in No. 3 mine good, and had received no complaints as to conditions there. He considered it to be a fairly good mine; considered the mine dusty, not in what would be considered sufficiently to propagate an explosion-wave, and considered it would require a blown-out shot or a primary explosion of gas to cause flame to start a dust-explosion. There had been no blasting in this mine since December, 1914. His opinion was that a primary explosion of gas must have started the explosion.

The conditions had changed in the levels lately; more timber had to be put in, and afterwards renewed, showing the roof and sides to be more tender; some faults of a minor nature had also been encountered lately in the Main and counter levels.

Replying to Mr. Ashworth, he gave his opinion that an open light, either from a broken lamp or some other source, would be sufficient to cause an explosion; he also stated that gas is given off from the working-places very freely; also feeders from the floor.

After inspecting the mine and listening to the evidence at the inquest, and reviewing the facts obtainable, I am of the opinion that a primary explosion of gas inside of No. 6 incline was the initial cause of the explosion, and that it was propagated through the mine by coal-dust.

From the facts we have the Main and counter levels showing from 2 to 2½ per cent. of fire-damp almost continuously. Lane swears that conditions got worse towards the end of the morning shift the day of the explosion. We have the afternoon shift following on in quick succession; the production of coal goes on, so does the generation of gas, and it would be safe to assume that conditions were still worse at the end of the afternoon shift than what they were at the end of the morning shift; more especially would this be so when the brushing is generally taken up on the afternoon shift, and it has been stated that more gas is given off from the bottom. One might take it from this that conditions were getting near the danger-line by 11 p.m. of the second shift, and it would only need some derangement of the ventilation or some increase of gas given off to give explosive conditions in the Main and counter levels and crosscut off the same. Added to this, there is the dust created by the breaking of the coal at the face and the loading of the cars; this is further carried on by the running of cars and trips.

In the Third Report of Explosion in Mines Committee, page 9, they say that when coal-dust of sufficient fineness was present only 2½ per cent. of fire-damp was necessary to form an explosive mixture, and the richness of coal-dust or its greater inflammability influences the rapidity and consequent violence of an explosion of dust and gas mixtures.

In the Main level of the mine, at the farthest point reached, attention was drawn to a slight upheaval of the floor; this was between two caves, and Manager Caufield mentioned in his evidence that it may indicate some unusual disturbance at this point and would be likely to give off an extra amount of gas, which would naturally increase the percentage which was already in the air travelling.

Until the level is cleared up it would be premature to give any decision as to what might have happened inside of No. 6 incline.

CAUSE OF IGNITION.

The usual causes assigned to mine explosions are as follows:—

1. Ignition by naked light.
2. Blasting.
3. Blown-out shots.
4. Electricity.
5. Large caves caused sparking from the hard rocks.
6. Sparks from pick striking sulphur-balls or hard rock.
7. Broken or defective safety-lamp.
8. Safety-lamp becoming overheated and dirty and in a condition to pass flame.
9. Matches.

In reviewing the probable cause of ignition we can eliminate several of the factors mentioned above.

No. 1. No naked lights were used in this mine.

Nos. 2 and 3. There has been no blasting in this mine since December, 1914.

No. 4 can also be eliminated; the electricity in the mine was what was used in signalling on the slope haulage, and this is too remote to be considered.

No. 5. There were large caves in the mine, but as far as examined they seemed to be a product of the explosion.

No. 6. While explosions may have occurred from this source, it seems a remote chance and one that would be hard to accept until all other causes had been eliminated.

In my opinion the case narrows down to safety-lamps or matches. So far there has been no matches found on any of the bodies recovered, but there are yet twelve bodies to be recovered from the district where it seems the explosion originated, so this question cannot be settled until these bodies are recovered.

The same applies to a question of a defective or broken safety-lamp, and at the best it is very hard to determine after an explosion whether a lamp has been broken after or before an explosion.

On the question of ignition, it would be premature to give any decision until all the bodies and lamps have been found in the area inside of No. 6 incline.

In connection with what has already been said, it may here be stated that in actual experiment with a gauze safety-lamp it was found that, while it would not cause an external explosion in 4.5 per cent. of fire-damp when the air was moving at a velocity of 370 feet a minute and was free from dust, it passed the flame and caused an explosion in ten seconds where only the ordinary amount of dust was floating in the air.

Conditions like the above could easily occur in a few minutes in the levels of No. 3 mine, Coal Creek Colliery.

CONDITION OF SAFETY-LAMPS FOUND.

Lamp No. 1343.—Wm. Silverwood, found at bottom of No. 5 incline on siding. Lamp in good condition, except a small indentation in shield and outer gauze.

Lamp No. 1392.—Wm. Checkley, found at bottom of No. 5 incline on siding. Lamp in good condition, shows signs of heat.

Lamp No. 27.—Wm. Puckey, fireboss, found at bottom of No. 5 incline on siding. Slight indentation in both gauzes, caused by blow on shield; glass, gauze-ring, and gauzes in good condition. Inside gauze brighter than outside, being a newer gauze.

Lamp No. 1345.—Henry Falop. Glass gauzes and ring in good condition; slight indentation on outer gauze and shield.

Lamp No. 1302.—Wm. Bird, found at bottom of No. 5 incline on siding. Slight indentation in gauzes and shield; glass, rings, and gauze-ring in good condition.

Lamp No. 1310.—James Smith, found at face of No. 3 room off No. 6 incline. Gauzes in good condition and clean; glass and gauze-ring in good condition. (Wick in lamp knocked down.)

Lamp No. 1316.—Frank Smith, found at face of No. 3 room off No. 6 incline. Gauzes in good condition and clean; glass and gauze-ring in good condition; slight indentation near top of gauze (wick in lamp knocked down); coking on shield of lamp; evidence of heat on both gauzes.

Lamp No. 1367.—John Monks, found in room No. 4 off No. 6 incline, 50 feet from face. Gauzes in good condition, except slight indentation in them; shield indented, causing above condition on gauzes; glass and gauze-ring in good condition, but bottom gauze-ring very uneven on surface.

Lamp No. 1321.—F. Benezeth, found at bottom of slope. Gauzes in good condition, evidence of gas burning in gauze; slight indentation in outer gauze near the top; glass and lower gauze-ring in good condition. This man worked in No. 2 room off No. 6 incline.

Lamp No. 1366.—G. Giacomazzi, found at the bottom of the slope; body not found. Lamp blown to pieces; glass and bottom gauze missing; top part of lamp torn away from bottom.

Lamp No. 1388.—J. Atkinson, found in No. 5 room off No. 6 incline. Top part of lamp found only; shield badly broken.

Lamp (No Number); Maker's No. 578,875.—J. Machin, found at bottom of slope. Lamp in good condition; inner gauze shows evidence of heat; bottom gauze-ring has uneven surface.

Lamp No. 1318.—F. Puillandre, found at bottom of Main slope. This man worked in the Main level; his body has not yet been found. Lamp unbroken; gauzes in good condition; glass, rings, and lower gauze-ring in good condition.

Lamp No. 618.—P. Gormley, found at bottom off Main slope with body. Glass broken; gauzes in good condition, except slight indentation on outer gauze; bottom gauze-ring a little uneven on surface.

Lamp No. 3440.—J. Machin, found on top of Main slope. Gauzes in good condition, but outside one very dirty; glass in good condition; bottom gauze-ring in good condition.

Lamp No. 1313.—Hugh Melarky. Lamp all smashed to pieces.

Lamp No. 2556.—Lamp found in pasture at mule-barn; lamp broken; gauzes found all punctured, presumably by caulks on horse-shoes. No record of this lamp given out at lamp-house.

The lamps broken seem to all have been broken by the force of the explosion. Lamp No. 1321 shows evidence of gas burning in the gauzes; this would indicate that there had been gas in No. 2 room during that shift, and that may have been the reason Benezeth was on his way out so early.

Lamp No. 1392, of Wm. Checkley, and *No. 1316*, of F. Smith, also show signs of heat, but this may have been from the flame of the explosion, as the dust on the shield was coked.

VENTILATION OF THE MINE.

The Inspector's measurement of the air-current on April 5th shows 53,000 cubic feet passing in the fan-drift. Taking the measurements of March 23rd, 1917, at the various places, we have 29,250 cubic feet at a point 100 feet inside of the South slope, 17,160 cubic feet 500 feet from the face of the level, and 13,000 cubic feet in the return from the last working-face. Assuming that some of the total quantity of the 53,000 cubic feet at the fan is used for the outside split, we will take the quantity on the inside of the South slope as being the amount going in for the working-faces. Then 13,000 cubic feet from 29,250 cubic feet gives us a leakage of 16,250 cubic feet or 55.5 per cent.

The mine is not ventilated according to the best mining practice considering the conditions met with. The split for the working-places is on too long a drag and the air is coursed the wrong way. The air is taken in and coursed up through the Nos. 1, 2, 3, and 4 incline districts, then into Nos. 5 and 6 inclines, and around the rooms off No. 6 incline and into the Main levels. There is a heavy drag on the air through friction and a subsequent loss in quantity.

There is an enormous leakage as shown by previous figures. While the system of ventilation was within the "Coal-mines Regulation Act," it was not as good as it could have been made, and in the writer's opinion an error was made in not providing a separate split for the level places where there was so large a generation of gas.

Thirteen thousand cubic feet as measured going through the levels would have been adequate providing it had been fresh air, but from analysis shown it contained 1.99 per cent. methane before it reached the levels.

ATMOSPHERIC CONDITIONS.

There was no unusual disturbance in the atmospheric condition that would have any bearing on the explosion. The barometer readings for six days prior to the explosion are as follows: 26.1, 25.9, 25.9, 26, 26.1, and 26.3 inches; these readings are taken from the fireboss report-book.

REPORTS OF OFFICIALS.

These reports are made in a way that do not give the true conditions; there seems to be an inclination merely to report a cap of gas. No information is given as to the size of cap, and whether it is increasing or decreasing or at any time eliminated. Again, one fireboss will report a small cap of gas; another will report free from explosive gas.

The morning-shift firebosses' report on April 5th states: "I have examined this mine and find a small cap of gas in return air from face of crosscut to face of counter-level; all other places clear and in safe condition." He does not report any cap in the Main level, although he admitted, when giving evidence, there was a $\frac{1}{2}$ -inch cap, and we have Overman Biggs's testimony there was $\frac{1}{2}$ inch; also Inspector Williams and Lane, the miner in the place, says there was $\frac{3}{4}$ inch. It seems strange the morning-shift fireboss did not report a cap in the level. From this it would seem that we cannot depend on the firebosses' reports as to giving the true conditions.

Coming to the overman's report, while the firebosses' reports show gas-caps practically all the month of March, he only reports a small cap four times. Even on April 5th, when Overman Biggs admitted that there was a $\frac{1}{2}$ -inch gas-cap in the Main level, he does not report it, but instead he reports: "I have examined No. 3 mine and found same free from explosive gas and in safe condition. The Inspector made his usual examination of the mine to-day and found the above-mentioned conditions." He does not state in the report that his fireboss found a $\frac{1}{2}$ -inch cap of gas in the return from the crosscut to the face of the counter-level. Therefore it seems that, so far as conveying information to the manager as to the state of the mine, the overman's report is worse than useless, as it tends to mislead him. It also seems very strange that, while the overman found a $\frac{1}{2}$ -inch gas-cap in the air in the level, he does not report it, and also correct the firebosses' report.

It seems to the writer that it would be better to record all gas-caps found, as to their length, and keep track of them until eliminated, and state as to whether they are just in thin stratum along the roof or whether the whole current is charged. The same should apply in cases of explosive gas, the quantity should be stated; from this it would be able to tell the true condition of affairs.

TESTING OF LAMPS.

Rule 10, "Coal-mines Regulation Act, 1911," provides for every safety lamp in use to be tested in an explosive mixture of gas and air at least once every week. This was done at the Crowsnest Pass mines, but in the opinion of the writer lamps should be tested every time they go into these mines, under the conditions they are working. The same rule also provides that every lamp shall be submitted to a mechanical air test whenever assembled after being taken apart. I did not see any mechanical air test in use at these mines. It would therefore seem that for five days every week the only test the lamps were put to was the firebosses' test.

DUST.

Considerable discussion arose at the inquest as to whether this mine was dusty or not. From personal observations of the writer, he would class it as a dusty mine. There was a system of watering being done in this mine, but it was inadequate against the amount of dust being made. Rule 13, "Coal-mines Regulation Act," exempts this mine from any treatment of the coal-dust, as no explosives are used and safety-lamps only are in use.

CONCLUDING REMARKS AND SUGGESTIONS.

A good deal of comment was made at the inquest on the amount of gas in the current that the men were allowed to work in, and the question arose as to what was termed the dangerous condition referred to in General Rule 8, "Coal-mines Regulation Act, 1911." This rule reads: "If at any time it is found by the person for the time being in charge of the mine or any part thereof that by reason of noxious gases prevailing in such mine or such part thereof, or of any cause whatever, the mine or said part is dangerous, every workman shall be withdrawn from the mine or such part thereof as is so found dangerous."

This rule practically leaves it to the person for the time being in charge to determine what is the dangerous condition. There is such a variation of opinion on this that no two persons will hardly agree. This matter was discussed for years in Great Britain by the different authorities, and was finally settled by inserting in the "Coal-mines Regulation Act, 1911," the following: "For the purpose of this section, a place shall be deemed dangerous if the percentage of inflammable gas in the general body of air in that place is found to be two and a half or upwards, or, if situate in a part of a mine worked with naked lights, one and one-quarter or upwards."

If a workman discovers the presence of inflammable gas in his working-place, he shall immediately withdraw therefrom and inform the fireman, examiner, or deputy.

The writer would suggest that some standard percentage of gas in the current be set for the British Columbia mines on the withdrawal of workmen.

In reviewing the cause and extent of mine explosions, there are three essential factors which enter into an explosion:—

First: There has to be an explosive mixture of gas, or of gas and dust.

Second: There has to be a means of ignition.

Third: There has to be sufficient quantity of gas, or of dust, to propagate it through the workings of the mine.

To deal with these factors and prevent as far as possible these explosions, the following should be done:—

First: Large volumes of air at moderate velocities should be circulated through the mines to keep them clear of gas, sufficiently that it would be impossible to find a trace of gas in the air-currents with a safety-lamp. This air should be well conducted to the working-places to prevent small accumulations in cavities at the faces. If dust is being made at the faces, this should be thoroughly allayed by means of water; the faces should be kept in a thoroughly saturated condition. Splitting of the air-current as often as possible should be resorted to, so that the gases given off in the district would not be carried into another.

Second: To prevent as far as possible ignition in the event of explosive conditions occurring. All means of ignition should be removed. In places or mines where danger is suspected no blasting should be allowed; no matches or material for striking a light should be allowed. If gauze safety-lamps are used, they should be tested in an explosive mixture daily before they are allowed in the mine. If the coal is friable and makes a large amount of dust, some approved form of electric lamp should be used for the actual working operations, and a gauze safety-lamp kept in the place for testing purposes only.

Third: Provision should be made that, if an explosion should occur, every means should be used to try and localize it.

The writer would suggest that all working-places where a large amount of dust is made should be efficiently watered to allay the dust, if not naturally damp. All haulage-roads, if not naturally damp, should be stone-dusted. At the entrance to each district stone-dust barriers should be erected to prevent the propagation of the explosion. In all leading places where gas is being generated, or in any places where danger from gas is suspected, stone-dust barriers or some other means of neutralizing should be adopted, so that in the event of a primary explosion occurring it would be stopped in its initial stages. If stone-dust barriers had been erected in the Main levels of the No. 3 mine, inside of No. 6 incline and also in Nos. 5 and 6 inclines, and the haulage-road had been stone-dusted, in all probability the explosion would have been confined to the area inside of No. 6 incline, with a consequent saving of human life and property.

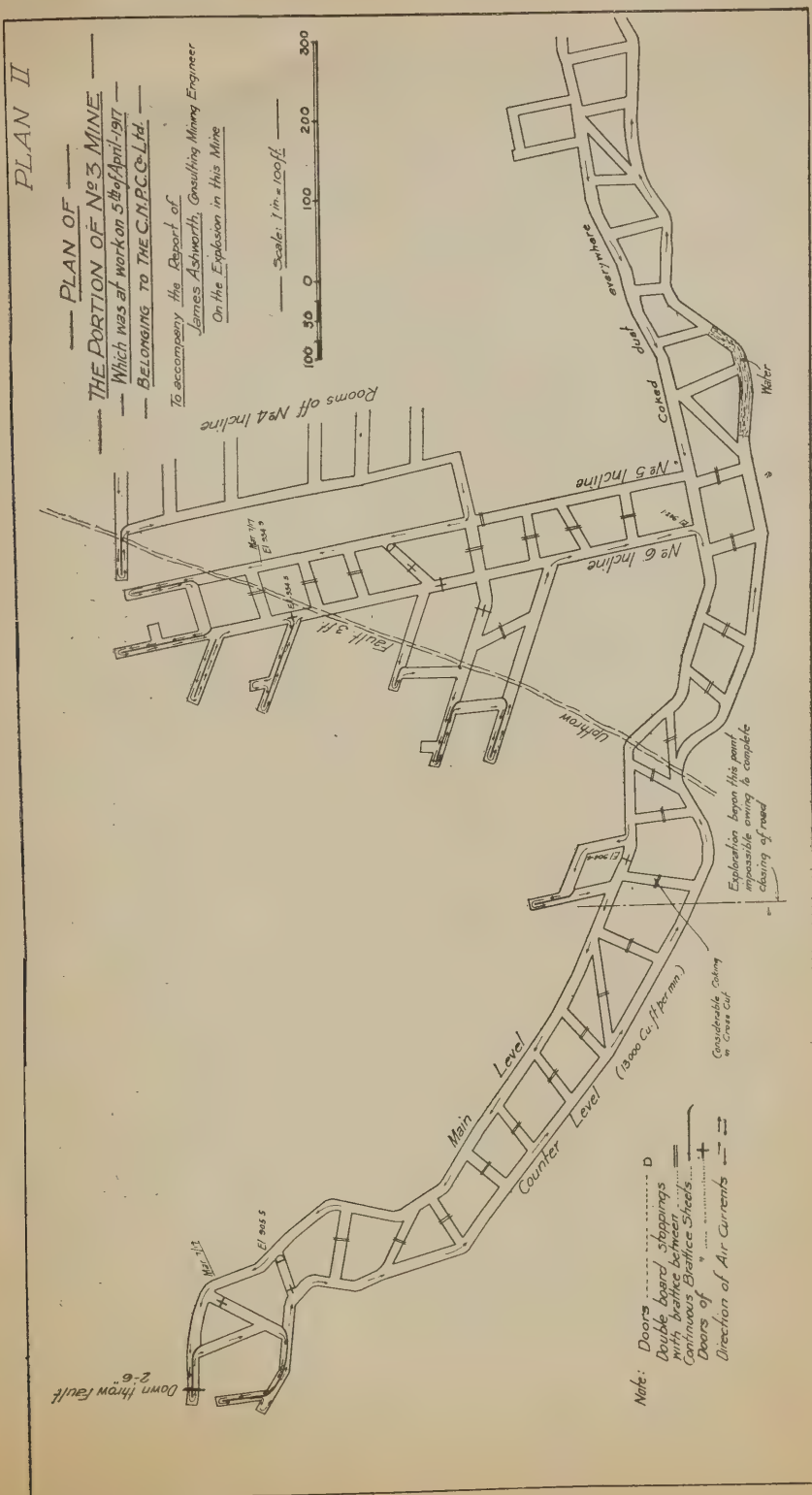
It is the writer's opinion that in all advance headings of gaseous mines frequent safety-zones should be erected to prevent the spreading of any local explosions that might occur.

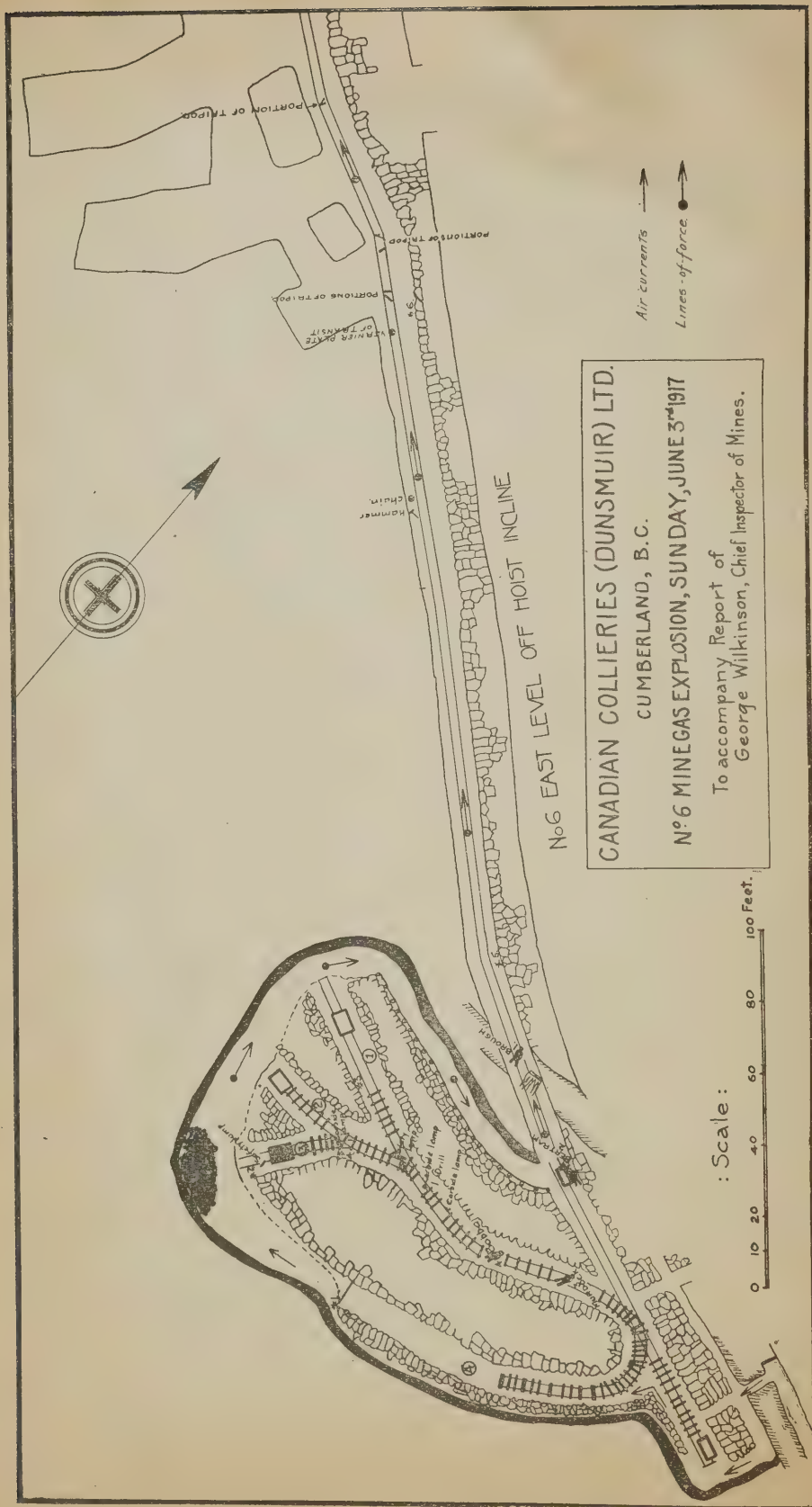
In reviewing the mine explosions occurring in the past, we find them getting more violent in our modern well-ventilated mines.

It is seldom we hear of a case of individual burning to a man in the present day. In the writer's opinion we do not have far to look for a reason. Years ago the writer remembers when there used to be lots of cases of individual burning of some miner; it would generally be a case of some miner lighting some gas in his place and getting burned, and that would be the extent of the explosion. Natural safety-zones were kept in the early days by insufficient ventilation, and when a local explosion did occur it died out for lack of oxygen. In the early days when the mines were using naked lights it was no uncommon thing for gas to be lighted up several times daily, and it would just be a local flash and then go out. What would be the result now if a local explosion occurred in most of the mines? It would spread over all the mine. There must be some reason. In recent years in mines the whole tendency has been improvement in ventilation, without paying sufficient attention to other factors which play just as important a part. Mines that use safety-lamps and do not use explosives are exempt from treating coal-dust.

A mine with a normal percentage of dust in suspension in the air, in the event of a primary explosion of gas, is just as dangerous as a mine full of gas; more especially is this so in well-ventilated mines where there is a plentiful supply of oxygen, where the flame from the explosion distils the carbon from the dust, forming CO, which is combustible and transmits the flame of the explosion through the workings of the mine.

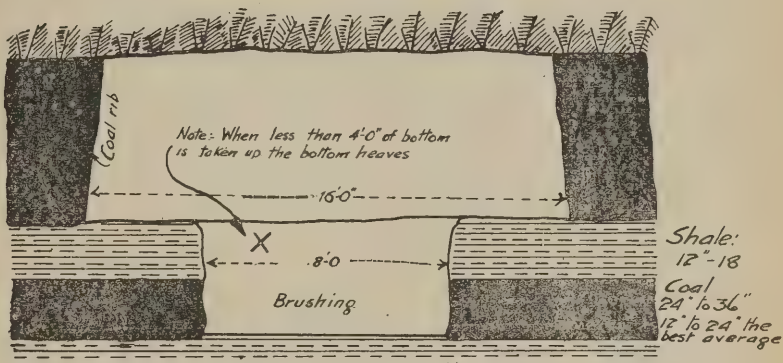
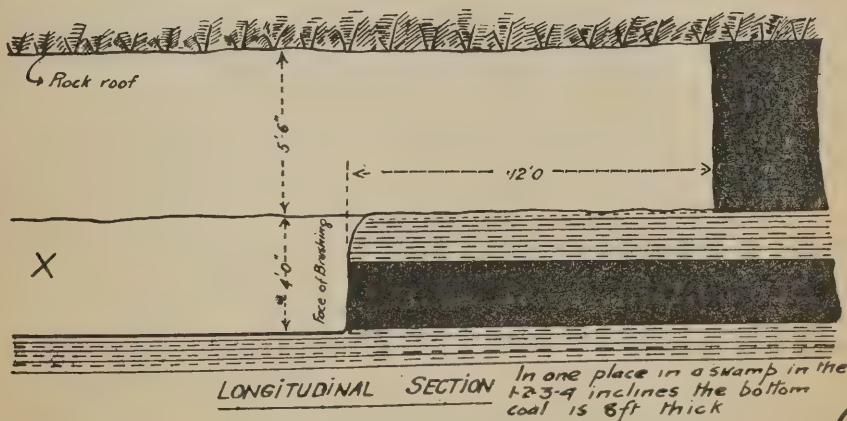
Appended to this report is a plan of No. 3 mine, showing positions of bodies found and general lines of explosive blast and direction of ventilating-current.

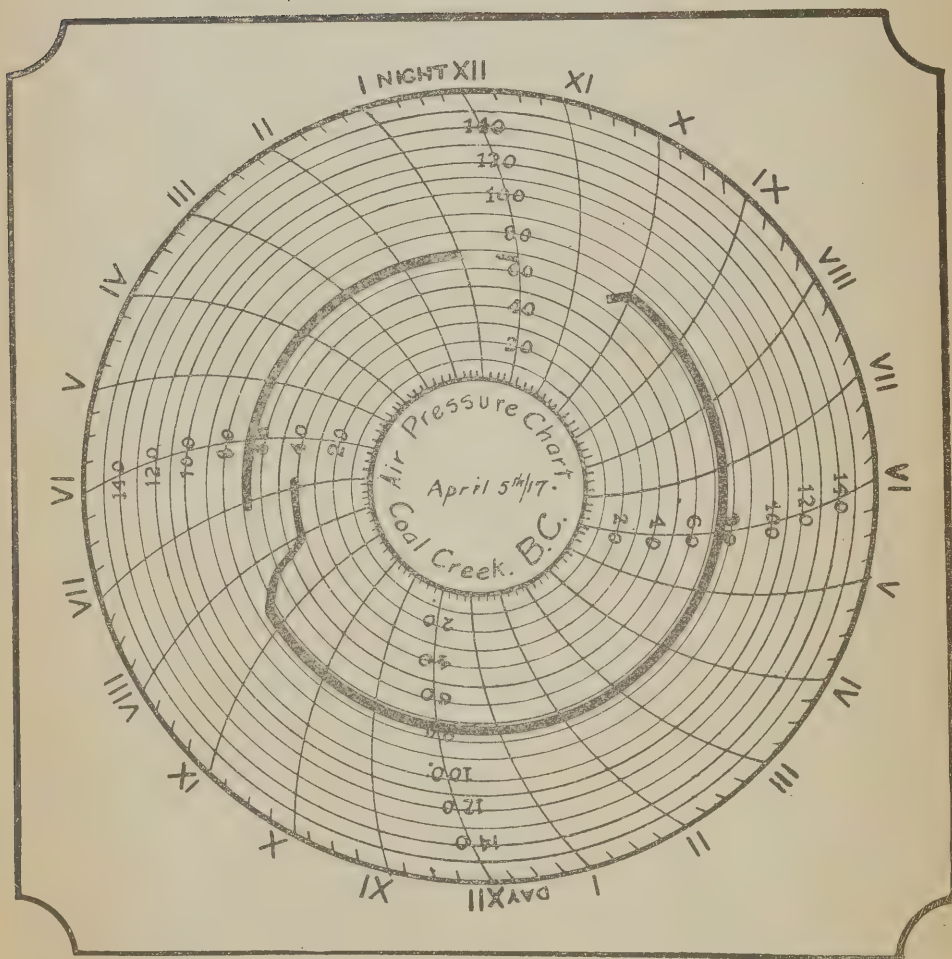




SECTIONS

- OF -

N^o 6 INCLINE N^o 3 MINECOAL CREEKScale: 1" = 40'CROSS SECTION



EXPLOSION AT No. 3 MINE, COAL CREEK COLLIERY.

REPORT BY THOMAS GRAHAM (LATE CHIEF INSPECTOR OF MINES).¹

On or about 10.10 p.m., April 5th, 1917, a disastrous explosion occurred in No. 3 mine of the Coal Creek Colliery, situated at Coal Creek, B.C., and owned and operated by the Crow's Nest Pass Coal Company, Limited. The explosion caused the death of thirty-four persons, this being the total number in the mine at the time of the explosion.

A telegram from T. H. Williams, Inspector of Mines, Fernie, stating that an explosion had occurred at No. 3 mine, reached me at 11.30 p.m. that night. Having that day severed my connection as Chief Inspector of Mines to the Department, to accept a position with the Canadian Collieries (Dunsmuir), Limited, I communicated the contents of telegram to you via long-distance telephone at Nanaimo, B.C.

Through your permission was obtained from H. S. Fleming and J. M. Savage, managing director and general manager, respectively, of the Canadian Collieries (Dunsmuir), Limited, for my leave of absence; and under telephonic instructions, confirmed by your letter of April 7th, I proceeded to Coal Creek as your representative until the arrival of the new Chief Inspector of Mines, and to remain as long as my successor deemed my services necessary.

In company with Dudley Michell, First-aid Instructor to the Department, I left Victoria on the afternoon of the following day, and reached Fernie on the evening of the 8th, being joined en route by Robert Strachan, Inspector of Mines, Merritt, B.C.

SITUATION OF COLLIERY.

The Coal Creek Colliery is situated on Coal creek, a tributary of the Elk river, and lies about five miles east of Fernie. The colliery is served by the Morrissey, Fernie & Michel Railway, which makes connections with the Canadian Pacific Railway and the Great Northern Railway at Fernie.

The mines are opened at a point on Coal creek where the coal-seams in their eastward pitch reach the level of the creek, the strike of the seam being approximately at right angles to the valley; the openings consist of drifts in the seams, starting on each side of the valley. At the point of opening the valley of Coal creek is about 1,000 feet in width, and is spanned with a steel tippie to which the coal from the various mines on each side of the valley is conveyed for preparation and loading. The mountains on each side of the creek rise to a height of 2,500 feet.

Nos. 2 and 3 mines are opened on the same seam, the mine-mouths converging from a common point at the south end of the tippie and at tippie level, No. 2 mine being on the strike, whilst No. 3 follows the dip by slope; the seam worked is locally known as No. 2 seam and in the geological series is the lower of the seams now worked at this colliery.

These two mines were opened about 1898 and were, practically speaking, one mine, as connections were made at many points. The system of operation was an irregular pillar and stall, the pillars being much too small for the future extensive operations needed to reach the main field, in view of the expected heavy cover, which reaches 2,600 feet at one mile from the mine portal.

No. 2 mine was the scene of a disastrous explosion on May 22nd, 1902, in which 128 lives were lost. This explosion devastated the No. 1 South levels off the slope in No. 3 mine, and the only persons saved from either mine were those operating on the North levels off No. 3 mine.

In 1907 and 1908, through irregular modes of operation, No. 2 mine was subject to a series of disastrous "bumps" accompanied with loss of life, and the Department of Mines at that time placed a restrictive prohibitory measure on the area so affected. Following the placing of the proscribed area in No. 2 mine, new levels were started off No. 2 mine to the westward and off No. 3 slope to the eastward to reach the inby portions of the field lying to the south and beyond the proscribed area. Levels were started off No. 3 slope, 1,600 feet from the portal, and were known as No. 2 South, a barrier pillar being left to the westward between these and the restricted area, and that portion of the old No. 2 and No. 3 workings lying outby the proscribed area was used as a return airway for No. 3 mine, and during the last few years a line of heavy stoppings were erected between this area used for return purposes and the old proscribed area. To the dip of No. 2 South level off No. 3 mine an attempt to operate by the long-wall advancing method was tried, but after spasmodic attempts was finally abandoned, and this area is now filled with water.

Two Main levels were finally pushed as feelers into the field, following the contour of the seam, and off these four inclines were pushed to the south-west, leaving a large barrier pillar outby and adjacent to the most southerly portion of the proscribed area of No. 2 mine. A few stalls were turned off No. 4 incline and paralleling the levels. One thousand feet beyond No. 4 incline two more inclines were started, running due west, and known as No. 5 and No. 6; whilst the levels projected some 1,200 or 1,300 feet beyond. The operations at the time of the explosion were confined to the Main levels, Nos. 5 and 6 inclines, and five stalls off No. 6 incline.

In 1911 a new mine known as No. 1 East was opened on what is locally known as No. 1 seam, lying in the series 150 feet vertical above Nos. 2 and 3 mines. This mine was projected to operate over the same area formerly worked by Nos. 2 and 3, and in view of experience gained in No. 2 through irregular modes of operation and excessive extraction on the first operations, this mine was planned to overcome such defects; the plans were rigidly adhered to and only 25 per cent. of the coal was recovered on first operations. (*See plan of mine, Minister of Mines' Report, 1915.*)

The mine was steadily developed, and in the fall of 1916 was producing 1,500 tons a day, the line of the old proscribed area underlying in No. 2 mine had been passed, and whilst the coal was more or less disturbed in the area, and some difficulty had been met in maintaining some roadways, a general impression prevailed that the mode of operation had been successful in overcoming the "bump" troubles. This impression was completely upset by the great "bump" of November, 1916, which devastated No. 1 East mine, shaking the surrounding country like an earthquake and completely destroying all that portion of the mine lying inby a line running east and west near No. 10 East level. This phenomena, together with the problems due to excessive emanations of gas from the field, was made the subject of a special examination and report by George S. Rice, Chief Mining Engineer to the United States Bureau of Mines, a copy of which is in your hands.

No. 3 mine, as already stated, is opened by a slope, the South levels leaving this some 1,600 feet from the portal; the levels follow the contour and extend from the slope about 7,000 feet. Haulage on the slope was by direct rope, and on the level from the slope to No. 1 incline by compressed-air locomotives, the inside gathering being by animal haulage.

The seam as worked in No. 3 mine is a high-grade bituminous coal from 5 to 5.5 feet in thickness, the floor being rather soft carbonaceous shale; the roof is strong hard sandy shale. The coal is friable, powdering finely and containing much gas; it is rather easily mined, especially when worked on the face-planes, but even on the butts it is mined without the use of explosives. A sample taken from the face of No. 2 incline in December, 1916, by Dudley Michell, of the British Columbia Mines Department, under direction of George S. Rice, and analysed by A. Fieldner, Chemist at the Laboratories of the United States Bureau of Mines, Pittsburgh, Pa., gave the following contents (*see Report of G. S. Rice, Coal Creek "Bumps"*):—

Proximate Analysis of Air-dried Coal.—Moisture, 0.55; volatile, 28.52; fixed carbon, 63.83; ash, 7.10; sulphur, 0.54; B.T.U., 14,319. From Memoir No. 59, Canadian Geological Survey.

Proximate Analysis of Air-dried Coal, No. 2 Mine.—Moisture, 1.3; volatile, 26.3; fixed carbon, 64.7; ash, 9; sulphur, 0.5; B.T.U., 13,820.

MINE PRODUCTION.

The mine was producing from 250 to 300 tons a day of two eight-hour shifts, and about thirty-four to thirty-six men a shift. A few men worked on the third shift brushing roadways.

VENTILATION.

The mine was ventilated by a Wilson fan, belt-driven, and was operated as an exhausting unit producing 50,000 cubic feet a minute, with a water gauge of $3\frac{1}{2}$ inches.

REPORTS ON MINE.

Inspectors' Reports.

Crow's Nest Pass Coal Company: Colliery known as Coal Creek No. 3.
Part of mine examined: Mine. Ventilation: Good.
Explosive gas: None. Small cap of gas in the last places on the air and in the return air.
Roadways: Good. Timbering: Good.
Remarks: I measured 32,000 cubic feet of air a minute for the use of forty-four men and eight horses.

Dated at Coal Creek, B.C., this 9th day of January, 1917.

(Signed.) T. H. WILLIAMS,
Inspector of Mines.

Crow's Nest Pass Coal Company: Colliery known as Coal Creek No. 3.

Part of mine examined: All the mine.

Ventilation: Poor at the face of the South level, but generally good throughout the rest of the mine.

Explosive gas: Face of South level, crosscut off South level, and counter of South level. These three places were fenced off and the men withdrawn.

Roadways: Good, but the South level haulage-road is dusty in places. Timbering: Good.

Remarks: I measured 35,000 cubic feet of air a minute on the main intake for the use of forty-three men and eight horses. This quantity is divided into two splits: South level split, 25,500 cubic feet a minute for forty men and eight horses, and for the Slope split I measured 6,000 cubic feet for three men and one horse.

Dated at Coal Creek, B.C., this 8th day of February, 1917.

(Signed.) GEORGE O'BRIEN,
Inspector of Mines.

Crow's Nest Pass Coal Company: Colliery known as Coal Creek No. 3.

Part of mine examined: Mine. Ventilation: Good.

Explosive gas: None. Roadways: Good. Timbering: Good.

Remarks: I measured 35,000 cubic feet of air a minute for the use of forty-three men and seven horses. There is a small cap of gas in the Main level and counter.

Dated at Coal Creek, B.C., this 9th day of March, 1917.

(Signed.) T. H. WILLIAMS,
Inspector of Mines.

Crow's Nest Pass Coal Company: Colliery known as Coal Creek No. 3.

Part of mine examined: Mine. Ventilation: Good.

Explosive gas: None. There is a ½-inch cap in the Main level, counter-level, and crosscut off it.

Roadways: Good. Timbering: Good.

Remarks: I measured 29,250 cubic feet of air a minute for the use of forty-three men and seven horses.

Dated at Coal Creek, B.C., this 5th day of April, 1917.

(Signed.) T. H. WILLIAMS,
Inspector of Mines.

Reports of Gas Committee of No 3 Mine, Coal Creek Colliery.

Mine: No. 3. Date: January 6th, 1917.

We, the undersigned, have this day examined the whole of No. 3 mine and find gas in No. 5 incline. All other places clear of explosive gas. Timber, roof, and sides: Good.

(Signed.) WM. BIRD; JNO. CHARNOCK.

Mine: No. 3. Date: February 17th, 1917.

We, the undersigned, have this day examined the whole of No. 3 mine and find a small cap of gas in No. 3 room off No. 4 incline, also gas in crosscut off South slope, same fenced off. Timber, roof, and sides: Good.

(Signed.) WM. BIRD; JNO. CHARNOCK.

Mine: No. 3. Date: March 17th, 1917.

We, the undersigned, have this day examined the whole of No. 3 mine and find gas in crosscut off counter. All other places clear. Timber, roof, and sides: Good.

(Signed.) WM. BIRD; JNO. CHARNOCK.

Reports of Overman from April 1st to 5th, 1917.

April 1st, 1917.

Sunday, mine idle. The mine was fenced off from 3.30 p.m. on Saturday until 6 p.m. on Sunday. Afternoon-shift firebosses report No. 3 mine free from explosive gas and in safe condition. Total men in mine, 4.

(Signed.) J. BIGGS.

April 2nd, 1917.

I have examined the main roads and found same in safe condition. Firebosses report No. 3 mine free from explosive gas and in safe condition. Total men in mine, 30.

(Signed.) J. BIGGS.

April 3rd, 1917.

I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Total men in mine, 81.

(Signed.) J. BIGGS.

April 4th, 1917.

I have examined No. 3 mine and found same free from explosive gas and in safe condition. Firebosses report No. 3 mine as stated above. Total men in mine, 90.

(Signed.) J. BIGGS.

April 5th, 1917.

I have examined No. 3 mine and found same free from explosive gas and in safe condition. The Inspector made his usual examination of the mine to-day and found the above-mentioned conditions. Afternoon- and night-shift firebosses report a little gas in crosscut off counter-level. Day-shift firebosses report all clear. Total men in mine, 94.

(Signed.) J. BIGGS.

Report of Firebosses from April 1st to 5th, 1917.

Mine: No. 3. Coal Creek Colliery.

District: Entrances. Date: April 1st. Time: 6 p.m.

Remarks: I have removed fences to examine main roads to pumps.

(Signed.) J. B.; W. R. PUCKEY.

Mine: No. 3, Coal Creek Colliery.

District: Main Roads. Date: April 1st. Time: 7.30 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined main roads and found them free from explosive gas and in safe condition.

(Signed.) J. B.; W. R. PUCKEY.

Mine: No. 3, Coal Creek Colliery.

District: Mine roads. Date: April 1st, 1917. Time: 10 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in safe condition.

(Signed.) J. B.; J. McCURT; W. R. PUCKEY.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 2nd, 1917. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas; all places clear and in safe condition.

(Signed.) J. B.; J. THOMPSON; J. McCURT.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 2nd, 1917. Time: 2.50 p.m.

Roof and sides: Safe. Ventilation: Good.

Barometer: 26.1. Thermometer: 42° Fahr.

(Signed.) J. B.; W. R. PUCKEY; J. THOMPSON.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 2nd, 1917. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in safe condition.

(Signed.) J. B.; J. McCURT; W. R. PUCKEY.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 3rd, 1917. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas; all places clear and in a safe condition.

(Signed.) J. B.; J. THOMPSON; J. McCURT.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 3rd, 1917. Time: 2.45 p.m.

Roof and sides: Safe. Ventilation: Good.

Barometer: 26.3 inches. Thermometer: 42° Fahr.

Remarks: I have examined this mine and found it free from explosive gas and in safe condition.

(Signed.) J. B.; W. R. PUCKEY; J. THOMPSON.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 3rd, 1917. Time: 10.30 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in a safe condition.

(Signed.) J. B.; J. McCURT.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 4th, 1917. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found it free from explosive gas and in safe condition.

(Signed.) J. B.; J. McCourt.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 4th, 1917. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places in safe condition.

(Signed.) J. B.; W. R. Puckey; J. Thompson.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 4th, 1917. Time: 11 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a little gas in crosscut off counter-level; all other places clear and in a safe condition.

(Signed.) J. B.; J. McCourt; W. R. Puckey.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 5th, 1917. Time: 7 a.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a little gas in crosscut off counter-level; all other places clear and in safe condition.

(Signed.) J. B.; J. Thompson; J. McCourt.

Mine: No. 3, Coal Creek Colliery.

District: Mine. Date: April 5th, 1917. Time: 3 p.m.

Roof and sides: Safe. Ventilation: Good.

Remarks: I have examined this mine and found a small cap of gas in return air from face of crosscut to face of counter-level; all other places clear and in safe condition.

(Signed.) W. R. Puckey; J. Thompson.

The ventilation was well conducted to the faces. The mine is classed as one of the most gaseous known, giving off large volumes of gas at all times. A series of mine-air samples taken over a period of time ranging from November, 1915, to March, 1917, and comprising some sixteen samples, show the mine ventilation to be carrying off 3,500 cubic feet of methane a ton of coal produced.

The emanation of gas from the face is not a constant quantity, but varies from time to time, coming in surges, necessitating the temporary retirement of the workmen from the face for a period after the occurrence of these surges, to allow time for clearance of the gas by the air-current.

The following are samples of air analysis taken from the Coal Creek mines. For complete set of samples see Chief Inspector's Report, 1916, in Minister of Mines' Report for that year.

November 18th, 1915.

SAMPLES OF AIR ANALYSIS.

Mine Working.

Sample No. 17, taken by T. H. Williams at No. 3 mine, Coal Creek, South Level district, 100 feet on return side of last working-place. Safety-lamp showed a $\frac{1}{2}$ -inch cap.

Chemical Analysis.

| | Per Cent. |
|----------------------|-----------|
| Carbon dioxide | 0.22 |
| Oxygen | 20.10 |
| Methane | 2.46 |
| Nitrogen | 77.22 |

Technical Analysis.

| | Per Cent. |
|------------------|-----------|
| Air | 96.03 |
| Fire-damp | 2.46 |
| Black-damp | 1.51 |

February 23rd, 1916.

Mine Idle.

Sample No. 31, taken by T. H. Williams at No. 3 mine, Coal Creek, South Level district, 200 feet on return side of last working-place. Safety-lamp showed a $\frac{1}{2}$ -inch cap.

Chemical Analysis.

| | Per Cent. |
|----------------------|-----------|
| Carbon dioxide | 0.15 |
| Oxygen | 20.32 |
| Methane | 2.29 |
| Nitrogen | 77.24 |

Technical Analysis.

| | Per Cent. |
|------------------|-----------|
| Air | 97.09 |
| Fire-damp | 2.29 |
| Black-damp | 0.62 |

February 24th, 1916.

Mine Working.

Sample No. 34, taken by T. H. Williams at No. 3 mine, Coal Creek, South Level district, about 200 feet on return side of last working-place. Safety-lamp showed a $\frac{5}{8}$ -inch cap.

| Chemical Analysis. | | Technical Analysis. | |
|----------------------|-----------|---------------------|-----------|
| | Per Cent. | | Per Cent. |
| Carbon dioxide | 0.16 | Air | 96.99 |
| Oxygen | 20.30 | Fire-damp | 2.05 |
| Methane | 2.05 | Black-damp | 0.96 |
| Nitrogen | 77.49 | | |

October 4th, 1916.

Mine Working.

Sample No. 71, taken by T. H. Williams at No. 3 mine, Coal Creek, South Level split, 300 feet from last working-place on return side. Safety-lamp showed a $\frac{5}{8}$ -inch cap.

| Chemical Analysis. | | Technical Analysis. | |
|----------------------|-----------|---------------------|-----------|
| | Per Cent. | | Per Cent. |
| Carbon dioxide | 0.21 | Air | 96.89 |
| Oxygen | 20.28 | Fire-damp | 2.06 |
| Methane | 2.06 | Black-damp | 1.05 |
| Nitrogen | 77.45 | | |

March 23rd, 1917.

Mine Working.

Sample No. 90, taken by T. H. Williams at No. 3 Coal Creek mine, South level, 150 feet on return side of last working-place. Safety-lamp showed a $\frac{3}{4}$ -inch cap.

| Chemical Analysis. | | Technical Analysis. | |
|----------------------|-----------|---------------------|-----------|
| | Per Cent. | | Per Cent. |
| Carbon dioxide | 0.38 | Air | 94.94 |
| Oxygen | 19.87 | Fire-damp | 3.43 |
| Methane | 3.43 | Black-damp | 1.63 |
| Nitrogen | 76.32 | | |

These large emanations of gas have made necessary the reduction of the number of men working on a split of air, in order to keep the air-current from carrying excessive percentages of gas before reaching the last working-place in the split. The number of men breaking down coal has rarely exceeded twenty or twenty-five, as it has been assumed that the volume of gas given off was in proportion to the quantity of coal broken down.

Recent returns of analyses from the field rather upset this theory, and tend to show that the volume of gas given off is rather in proportion to the area of coal exposed in ribs and faces than in the quantity broken down.

I am informed by Mr. Wilkinson, Chief Inspector of Mines, that a series of mine-air samples collected in the Michel Colliery, after a suspension of operations, due to labour troubles, for over thirty days, show a larger percentage of gas given off, with, in some instances, an increase of quantity of ventilation in circulation in the mine.

OLD No. 3, MICHEL COLLIERY.

In one instance a volume of 85,000 cubic feet a minute has been circulating in the mine continuously and no coal has been broken down for a period of thirty-four days, and yet the entire current was carrying 1.55 per cent. of methane, an increase of $\frac{1}{100}$ of 1 per cent. above that given off when mine was working.

Comparative Tests of the Outflow of Gas at Coal Creek Colliery, taken when the Mines were Working, also when Idle.

| Date. | Mine. | District or Split. | Per Cent. of CH ₄ . | Quantity of Air. | Remarks. |
|---------------------|------------------|-------------------------------------|--------------------------------|------------------|---------------|
| March 21, 1917..... | B | Main return..... | 1.13 | 37,000 | Working. |
| May 2, " | " | " | 0.77 | 42,300 | Idle 26 days. |
| March 21, " | " | Incline and left side of slope..... | 2.15 | 12,000 | Working. |
| May 2, " | " | Ditto | 0.44 | 12,000 | Idle 26 days. |
| March 21, " | " | Right side of slope... | 0.86 | 8,000 | Working. |
| May 2, " | " | " | 1.14 | 8,000 | Idle 26 days. |
| March 21, " | No. 1 North..... | Main return..... | 0.28 | 33,000 | Working. |
| May 2, " | " | " | 0.18 | 35,000 | Idle 27 days. |
| March 21, " | No. 1 South..... | " | 2.44 | 27,000 | Working. |
| May 2, " | " | " | 1.56 | 24,000 | Idle 26 days. |
| May 3, " | " | " | 0.98 | 21,000 | Working. |
| Oct. 3, 1916..... | No. 2..... | " | 0.72 | 42,000 | Idle 26 days. |
| May 2, 1917..... | " | " | 2.78 | 24,800 | Working. |
| March 23, " | No. 1 East..... | No. 18 room..... | 1.50 | 18,400 | Idle 27 days. |
| May 3, " | " | " | 1.72 | 160,000 | Working. |
| Nov. 2, 1916..... | " | Main return..... | 0.99 | 136,000 | Idle 27 days. |
| May 3, 1917..... | " | " | | | |

Michel Colliery.

| | | | | | |
|--------------------|-----------------|------------------|------|--------|-----------------|
| March 7, 1917..... | Old No. 3..... | Main return..... | 1.48 | 80,000 | Mine working. |
| April 4, " | " | " | 1.48 | 80,000 | Idle 96 hours. |
| May 3, " | " | " | 1.55 | 85,000 | " 34 days. |
| April 4, " | " | No. 3 Slope..... | 1.63 | 28,000 | " 96 hours. |
| May 3, " | " | " | 1.53 | 32,000 | " 34 days. |
| March 9, " | No. 3 East..... | No. 6 East | 0.78 | 46,200 | Working. |
| April 4, " | " | " | 0.79 | 42,000 | Idle 100 hours. |
| May 4, " | " | " | 0.76 | 48,000 | " 35 days. |
| March 9, " | " | Main return..... | 0.83 | 91,000 | Working. |
| April 4, " | " | " | 0.90 | 94,500 | Idle 100 hours. |
| May 4, " | " | " | 0.87 | 91,000 | " 35 days. |

The explosion in No. 3 mine, Coal Creek, on April 5th was the most destructive that in my long experience I have ever seen. The mine had a splendid roof and in many instances no timber supports were necessary in the main roadways, and it was confidently expected that recovery-work would only be retarded by the time necessary to restore ventilation. On the contrary, however, the greater proportion of the mine roadways were heavily caved; in many instances these caves were from 1,000 to 1,200 feet in length, and it would seem as if the pressures set up by the explosion were wave-like in motion, having extremes of high pressure to points of low pressure amounting to vacuums. That the intense pressures entered the crevices in the roof strata, and then the sudden release of pressure caused the extremely heavy caving, seems possible. The extent of this caving is shown by colour on the plan submitted with this report, and from a point about 500 feet in by the slopes are almost continuous to the face.

The initial cause is hard to determine, as an examination of the mine discloses that the lines of force came from the two advance Main levels, but owing to excessive caving these were completely blocked, and the faces have so far not been reached, and may possibly not be reached before the latter end of the present year. It would therefore be impossible to make any definite statement as to the point of origin or the initial cause, as it could only be mere supposition. As no explosives were used in the mine or colliery, we can eliminate the "blown-out-shot" theory, and therefore must assume an ignition of gas from some cause; the explosion in general as propagated throughout the mine was, however, undoubtedly supported by coal-dust.

As to whether the gas ignition was due to a defective or overheated lamp or a quantity of gas given off by one of the frequent surges, thrown into atmosphere by a "bump" or blow-out and a lamp-failure, can only be a matter of mere conjecture at this time. I, however, believe

that the point of ignition was on the two Main levels at some point inby that reached by the exploration parties, and was carried from this point throughout the entire mine by coal-dust.

The difficulties encountered by the rescue parties were many and serious, and many times hope of being able to reach the inner workings was almost given up. There were a number of fires encountered, some of them being of alarming proportions, and in many cases roadways had to be constructed through caves, with little opportunity to dispose of the debris, except passing it back from one to another over distances running into hundreds of feet.

The work accomplished, under the circumstances and in the time taken, speaks volumes for every man engaged in the hazardous work, and especially to those responsible for the organization of the same.

Despite the fact that the outer 500 feet of No. 2 South level and the 1,600 feet of the slope were wet, and contained little to support the explosion, considerable velocity must have existed even to the mine-mouth.

The body of Hugh Malarky, pumpman, was found about 25 feet inside the portal; this body had been thrown with much violence against the timbers, and a safety-lamp, supposed to have been issued to this man, was several days afterwards found in the mule pasture 1,000 feet from the mine-mouth.

Three bodies were found at the intersection of No. 2 South level and the slope, one of which, No. 2. F. Benetzeth, showed signs of life, but he died shortly afterwards. With the exception of this one victim, it is my opinion that all the others were instantly killed.

On Monday, April 9th, 1917, or four days after the explosion, the party reached the Nos. 1 and 2 inclines; these were explored that afternoon, but difficulty was found in reaching the inner inclines Nos. 5 and 6, owing to the rooms between Nos. 4 and 5 inclines being heavily and completely caved. There being a lack of ventilation to keep the Nos. 1, 2, 3, and 4 inclines clear and progress farther into the mine, it was decided to return to the overcast, some 2,000 feet outby, and take the overcast out, converting the counter or lower level into an intake to No. 4 incline; from this point to utilize the chain pillar to the west of the level between Nos. 4 and 5 inclines and save building stoppings in all the crosscuts between the two levels over the distance. This placed Nos. 1, 2, 3, and 4 on the return instead of on the intake air.

Tuesday, April 10th. Five bodies were found on the parting outside No. 5 incline; all of these bodies were badly burned.

Wednesday, April 11th. The face of No. 1 room off No. 6 incline was reached and the bodies of the miners were found at the face. No lamps were found; these are believed to be under cap-rock which was down close to the face. The face of this room was square and the room heavily caved.

The bodies of the men who worked in No. 2 room were found at the foot of the slope; this room was heavily caved.

No. 3 Room.—Here the bodies of Frank and James Smith, father and son respectively, were found; both bodies were badly burned and were close up to the face. The room was caved to within a few feet of the face; there was a slight trace of coking on the floor. The face-line was square and the coal sounded loose on face.

No. 4 Room.—This room and crosscut were heavily caved, and on the upper rib, about midway between the incline and crosscut, the clothes, dinner-pails, and tools of the workmen were found. The bodies were afterwards found near this place, but under a cave.

No. 5 Room.—Heavily caved near the face; the bodies were found under the tail of the cave at face. The face was square and coal loose, but no evidence of coke was found.

No. 6 Incline was not caved above the last crosscut, but all timbers were blown out. The workmen from this room were found amongst those found at the parting outside No. 5 incline. A blue-print showing plan and section of this place accompanies report. The sketch-plan shows the mode of brushing in the main haulage-roads.

In a crosscut off this incline, leading to No. 5 incline, the bodies of Campbell and Coates were found; both bodies were under a cave.

No. 5 Incline.—This place was not caved above the crosscut; two bodies were found near a car at the last crosscut; the car was badly broken and showed counter-currents; both bodies were badly broken. Coke was found on the timbers in this crosscut just out by car. A series of samples of dust were taken in the mine, and an analysis showed much alteration in all samples except Nos. 3 and 5.

The following show the analyses as made by the Provincial Mineralogist:—

| | Moisture. | Volatile Matter. | Fixed Carbon. | Ash. |
|------------|-----------|------------------|---------------|-----------|
| | Per Cent. | Per Cent. | Per Cent. | Per Cent. |
| No. 1..... | 1.6 | 11.3 | 75.3 | 11.8 |
| No. 2..... | 1.1 | 13.6 | 62.8 | 22.5 |
| No. 3..... | 1.8 | 12.5 | 75.9 | 9.8 |
| No. 4..... | 0.8 | 16.4 | 66.8 | 16.0 |
| No. 5..... | 0.9 | 16.7 | 79.3 | 3.1 |
| No. 6..... | 1.2 | 14.4 | 70.7 | 13.7 |
| No. 7..... | 1.3 | 11.4 | 61.4 | 25.9 |

Sample No. 1.—Off timber just below crosscut, opposite last break-through on first incline.
Sample No. 2.—Off timber at edge of last crosscut on No. 1 incline.
Sample No. 3.—Off timber in crosscut between Nos. 1 and 2 rooms, No. 4 incline.
Sample No. 4.—Off upper bench of No. 6 incline, opposite No. 2 room.
Sample No. 5.—Off lower rib of Main level, last crosscut at barrier pillar.
Sample No. 6.—Off timber at last crosscut, No. 2 room, No. 6 incline.
Sample No. 7.—Off timber at last crosscut (through) between Nos. 5 and 6 inclines.

Proximate analyses of samples taken from the same places were made by the Crow's Nest Pass Coal Company, the results of which are also given, together with analyses of dust samples taken from safety-lamps recovered in the mine.

The Crow's Nest Pass Coal Co., Ltd. (May 2nd, 1917.)—Samples of Coal-dust taken from No. 3 Mine.

(Submitted by D. Michell.)

| Analysis No. | Description. | Moisture. | Vol. Comb. Matter. | Fixed Carbon. | Ash. | Sulphur. | Remarks. |
|-----------------------|--|-----------|--------------------|---------------|-----------|----------|----------|
| | | Per Cent. | Per Cent. | Per Cent. | Per Cent. | | |
| April 10 02344... | Sample No. 2. Coked dust taken about 300 feet from Main slope on South level at a point about opposite to where fire was burning in crosscut | 0.65 | 17.38 | 69.81 | 12.16 | .... | .... |
| 02345... | Sample No. 3. Dust from timber lying across roadway about 200 feet in from South slope | 0.60 | 24.68 | 59.12 | 15.60 | .... | .... |
| 02347... | Sample No. 5. Dust taken from end of sixth car on parting; this car was off track | 1.11 | 20.82 | 69.17 | 8.90 | .... | .... |
| 02346... | Sample No. 4. Dust taken from rib of coal at same point as No. 3 | 1.30 | 23.83 | 63.65 | 11.22 | .... | .... |
| 02348... | Sample No. 6. Dust taken from prop standing on lower side of roadway on Main level between Nos. 3 and 4 inclines | 0.90 | 20.31 | 69.62 | 9.17 | .... | .... |
| April 9. 02349... | Sample No. 1. From timber just below crosscut opposite break-through on No. 1 incline | 1.00 | 12.53 | 74.43 | 12.04 | .... | .... |
| 02350... | Sample No. 2. Taken in No. 1 incline at edge of last crosscut (on timber) | 0.68 | 15.62 | 60.85 | 22.85 | .... | .... |
| 02351... | Sample No. 3. Taken from timber in crosscut between Nos. 1 and 2 rooms off No. 4 incline | 1.06 | 13.78 | 75.42 | 9.74 | .... | .... |
| April 11. 02352... | Sample No. 7. Taken from lower rib opposite left crosscut before barrier pillar on Main level | 0.60 | 17.93 | 75.83 | 5.64 | .... | .... |

Dust Samples taken from Safety-lamps recovered after Explosion in No. 3 Mine.

(Submitted by D. Michell for Proximate Analysis.)

| Analysis No. | Description. | Moisture. | Vol. Comb. Matter. | Fixed Carbon. | Ash. | Sulphur. | Remarks |
|--------------|--------------------|-----------|--------------------|---------------|-----------|----------|---------|
| | | Per Cent. | Per Cent. | Per Cent. | Per Cent. | | |
| 02353... | Lamp No. 1345..... | 0.74 | 20.36 | 59.79 | 19.11 | .... | .... |
| 02356... | " 1321..... | 0.86 | 22.04 | 62.03 | 15.07 | .... | .... |
| 02357... | " ? | 0.64 | 23.18 | 60.48 | 15.70 | .... | .... |
| 02358... | " 27..... | 0.68 | 20.23 | 64.70 | 14.39 | .... | .... |
| 02359... | " 1302..... | 21.86 | 59.36 | 18.78 | .... | .... | .... |
| 02360... | " 1392..... | 24.88 | 58.32 | 16.80 | .... | .... | .... |
| 02361... | " 3440..... | 24.92 | 61.22 | 13.86 | .... | .... | .... |
| 02362... | " 1367..... | 21.30 | 58.40 | 20.30 | .... | .... | .... |

NOTE.—Samples taken from lamps Nos. 1318, 1343, and 1316 are too small for proximate analysis.

Sample of Coal-dust taken from Upper Bench opposite No. 2 Room, No. 6 Incline, No. 3 Mine.

| Analysis No. | Description. | Moisture. | Vol. Comb. Matter. | Fixed Carbon. | Ash. | Sulphur. | Remarks. |
|--------------|--------------|-----------|--------------------|---------------|-----------|----------|----------|
| | | Per Cent. | | Per Cent. | Per Cent. | | |
| 02363... | | 20.40 | | 67.60 | 12.00 | .... | .... |

Average Analysis of Coal from No. 3 Mine.

| Analysis No. | Description. | Moisture. | Vol. Comb. Matter. | Fixed Carbon. | Ash. | Sulphur. | Remarks. |
|--------------|--------------|-----------|--------------------|---------------|-----------|----------|----------|
| | | Per Cent. | Per Cent. | Per Cent. | Per Cent. | | |
| | | 0.50 | 21.50 | 69.00 | 9.00 | .... | .... |

Lamps were examined in the lamp-room in the presence of James Ashworth, George Wilkinson, Robert Strachan, T. H. Williams, George O'Brien, Charles Graham, Albert Fawcett, Robert Johnstone, and Thomas Graham.

The dust samples shown in the above analyses were taken from the lamps at this time.

Lamp No. 1343.—W. Silverwood, lamp found near foot of No. 5 incline. Gauzes and lower ventilating-ring clear and sound; bonnet broken by outside influence. Found under a cave.

Lamp No. 1392.—T. Checkley, lamp found under cave at foot of No. 5 incline. Ring and gauze in good shape; very little dust on lamp.

Lamp No. 27.—Thos. Puckey, fireboss, lamp found under cave at foot of No. 5 incline. Lower ventilating-ring, gauzes, and glass in good condition.

Lamp No. 1345.—Henry Falip, lamp found under cave at foot of No. 5 incline. Lower ventilating-ring, gauzes, and glass in good shape; shield injured by cave.

Lamp No. 1302.—William Bird, found under cave at foot of No. 5 incline. Lower ventilating-ring, gauzes, and glass in good shape; shield slightly dented.

Lamp No. 1310.—James Smith, found at face of No. 3 room, off No. 6. Lower ventilating-ring, gauzes, and glass in good shape; inner gauze very clean.

Lamp No. 1316.—Frank Smith, same place as lamp No. 1310. Lower ventilating-ring, gauzes, and glass in good shape.

Lamp No. 1367.—John Monks, room No. 4 off No. 6 incline. Lamp found 50 feet from face; shield dented and coke on shield; lower ventilating-ring, gauzes, and glass clear and in good shape.

Lamp No. 1321.—F. Benezeth, miner, No. 2 room off No. 6 incline. Body and lamp found at foot of Main slope; lower ventilating-ring much blocked with dust; glass very dirty; inner gauze shows evidence of gas having burned in the lamp; outer gauze clear.

Lamp No. 1366.—Govi Giacomazzi, miner, No. 2 room off No. 6 incline. Body and lamp found at foot of slope; no glass in lamp; top off the lamp; only the outer gauze found; slight evidence of heating on this gauze.

Lamp No. 1388.—J. Atkinson. Body found in No. 5 room off No. 6 incline; only shield of lamp found.

Lamp with no working number, supposed to be the rope-rider's lamp, found at bottom of slope. One standard and lock-guard gone; lower ventilating-ring dirty. Maker's number of lamp, 578875.

Lamp No. 1318.—Frank Pullandre, lamp found at bottom of Main slope. Glass clean; gauzes in good shape; lower ventilating-ring dirty.

Lamp No. 618.—Found bottom of Main slope. Glass broken and one standard missing; gauzes all right.

Lamp No. 3440.—J. Machim, rope-rider. Supposed to be a spare lamp and was found at the top of the slope. Body of Machim found at the bottom of the slope; glass all right; outer gauze very muddy.

Lamp No. 1313.—Hugh Malarky, pumpman. Found lamp much broken; picked up in pieces.

Lamp No. 2556.—Found in pasture 1,000 feet from the mouth of slope; holes in gauzes, due to caulks on horse's shoes and done in mule pasture.

The operation of this field presents many difficulties; in its short history it has been the scene of many serious disasters, accompanied by a heavy toll of human life and much serious damage to property.

Many unjust criticisms have been hurled at the various managements and at the Government Inspection Service because of these serious accidents, with little knowledge on the part of the critics as to the serious problems that this field presents, problems that are peculiar to this field alone, and which, to be overcome, must be the subject of systematic research covering a period of years.

The great gas blow-outs of the Morrissey Colliery, 1904 to 1908, the earth-rocking "bumps" at the Coal Creek Colliery, 1908 to 1916, and the almost unbelievable quantities of gas given off daily through the ventilating-fans present difficulties that must be made the subject of systematic scientific research, if this, the most valuable coalfield in western America, is to be successfully operated.

The problems presented have exhausted the best efforts of those who have been in charge of the operations, and this fact prompted the recommendation of the writer, following the great "bumps" of November, 1916, for the appointment of some eminent engineer to make an impartial and independent report upon the field.

The Department was fortunate in obtaining the services of George S. Rice, Chief Engineer of the United States Bureau of Mines, for this work. Mr. Rice's very able report, which is in your hands, conveys to you some idea of the many problems that the future operations of the field contain, and makes recommendations that should have the most earnest consideration of the Government.

The economic value of the field is one of the great assets of our Province, and it is destined to play a very important part in future development of the great mineral wealth we all firmly believe our Province to contain; in short, the successful operation of this great coalfield is necessary to the successful development of our great mineral wealth, and justifies any expenditure that may be made with a view to making possible the recovery of the great coal-deposits with a minimum of risk to the lives of those employed.

The facilities for carrying out research-work with our coals, afforded Mr. Rice through his connection with the United States Bureau of Mines, at their well-equipped laboratories at Pittsburgh, Pa., enabled him to obtain valuable information on the gas contents of the Crowsnest Pass coals which otherwise might have remained unknown for some time. I here refer to the experiments carried out by A. C. Fieldner, Chemist to the Bureau of Mines, and described in the report of Mr. Rice (*see* pages 15 to 18). In these experiments the coal was ground in an evacuated, revolving steel tube-mill for a period of two hours, and after which 90 per cent. of the coal passed through a 200-mesh screen; the mill was then connected to a Mercury pump

and evacuated, the gas collected, measured, and analysed. The results were most astonishing, and showed that 100 grammes of Crowsnest coal gave off 163.6 cubic centimetres of methane plus ethane, whilst 100 grammes of Pittsburgh coal gave off 9.1 cubic centimetres of methane plus ethane. Of the 163.6 cubic centimetres of gas given off by the Crowsnest Pass coal, 126 c.c. was ethane, whilst the ethane content of the 9.1 c.c. of gas contained in the Pittsburgh coal was 2.5 c.c. Former analyses of gas samples collected in the field had failed to show any ethane content, notwithstanding that duplicate samples had been collected by the British Columbia Inspection Service, one sample being sent to the Mines Department at Ottawa and the other sample to the United States Bureau of Mines at Pittsburgh, Pa., with the request that special attention be given to the possibility of ethane being contained in the gas. It would therefore appear that the breaking-down of the molecular structure of the coal has much to do with the gas emanations.

The friability of Crowsnest coals is conducive to easy crushing, and the grinding induced by the heavy overlying strata on the supporting pillars, as well as that produced in mining haulage, movement of animals and men, must be releasing daily a large volume of the lighter gases into the mine atmosphere.

When we consider that the inflammability of ethane is so much lower than that of methane, we have an additional danger present in this already dangerous field; the range of inflammability of ethane being from 2.5 to 5, whilst that of methane is 5.5 to 14.5.

These facts make highly necessary the appointment of a commission on research, along lines laid down in the report of Mr. Rice, and should take up the study of the geology of the field in relation to earth-movements. The chemistry of the coal and gas contents should be the subject of the most careful investigation and research, and last, but not least, a systematic and careful study of modes of operation in the field, with a view to obtaining the maximum tonnage yield with the minimum risk to those engaged in the production of the coal. The latter problem is one that must necessarily mean much experimenting, and will consequently cover a period of many years; but it is highly essential to the future of the field, and much care should be exercised in the choice of the mining engineer and operating man recommended as part of the commission.

I have been more or less associated with the field since 1902, and during that period I have always felt and advocated that the only successful mode of operating the seam known as No. 2, and which is identical with the seam worked in No. 3, where the recent explosion occurred, is by the long-wall method; the height of coal, 5 to 5.5 feet, is well adapted to this system. Further, I believe that the long-wall operation of this seam, if carefully carried out from the outcrop, would, as evidenced by the operations conducted in this seam at No. 9 mine on the north side of the valley at Coal creek, tend to break the overlying stratas in a series of slices to the surface, and such breaks would act as outlets for the great volumes of gas contained in the various seams overlying the No. 2 seam.

It will be contended that the operation of the No. 2 seam, which lies below several other seams in the field, would destroy these overlying seams and render their future recovery impossible.

I am of the opinion that the extraction of the No. 2 seam, which lies 150 feet below the seam known as No. 1, or that being operated in the No. 1 East mine at Coal creek, would, if properly conducted and properly extracted, in no way seriously injure the No. 1 seam, or in any way add to the difficulties or cost of operation. I base this opinion on the conditions found in No. 1 East mine, operating in the Upper seam, when working over what is known as the proscribed area in the Lower or No. 2 seam. Here, it is true, there was evidence of a crushed zone near that portion of the field affected in this restricted area, but the method of extraction of the Lower or No. 2 seam, directly under this section, was so irregular in its mode that it was highly conducive to bringing on a squeeze or creep, and again there is the possibility referred to in my report on the "bumps" of November, 1916, of a naturally weak or shear zone in the mountain at this point.

All things considered, I am fully convinced that a well-conducted long-wall system in the No. 2 seam would be the means of obtaining a greater extraction of coal from a given area, a more uniform subsidence with a greater area of support for the overburden, break the overburden so that a reoccurrence of the great "bumps" would be minimized, and through such breaks relieve and drain the overlying seams of their great volumes of gas, rendering their future operation more secure and the general ventilation of the field much easier.

Further, the expanse of face in a long-wall operation would tend to reduce the possibility of heavy outbursts of gas now encountered in the leading places in the present pillar-and-stall mode.

I am further of the opinion that, in view of recent occurrences, gas contained in this field is such in quantity and in pressure, at depths from the face, that it will be found impossible to drive and maintain two or more openings like the present levels into the main body of the field without encountering such outbursts of gas, accompanied by either upheaval of floor or outbursts of fine coal and gas, as to render the operation of the field in this manner impossible.

Much credit should be given W. R. Wilson for his desire to adopt any or all means at his disposal to render the operations safe, and the recent announcements that electric safety-lamps would be used is in keeping with his advanced ideas for the future operations. These lamps should be some assistance in safeguarding the operations, inasmuch as the surges of gas given off at the faces often enveloped the miner in an explosive mixture before he was aware of the presence of the gas, or before he could retreat if aware of the quantity present, and all that stood between the men and a disastrous explosion was the efficiency of flame safety-lamp, a slight defect, an overheating, or an accident to the lamp meant disaster. The introduction of the electric lamp will reduce the number of the flame-lamps in the mine by at least 90 per cent., and will render the chance of ignition from this source in proportion to the number of flame-lamps in use.

Much is being made of the question of a single shift; in the light of the recent mine-air samples, taken after a period of idleness reaching thirty or more days, it seems doubtful if this would be of much benefit.

As already stated, it was deemed at one time that the gas-outflow was in proportion to the amount of coal broken down; it now appears that it is more in proportion to the area of face and ribs exposed. If the latter contention is correct, then the single-shift theory could in no way be a remedy, inasmuch that to obtain a given output of coal per day by a single-shift method would require twice the exposed area necessary for a similar production by the double shift, and consequently a much-enhanced or increased outflow of gas.

In conclusion, I cannot too urgently impress upon you the need for early consideration of the problems in this field.

The management and your inspection force have long carried a serious responsibility, a greater responsibility in the light of recent discoveries than even they realized; and in view of the now general knowledge that the field presents difficulties in greater proportion than any other known coalfield, it is only fair to them that they should be supported and assisted in their work by a commission composed of the ablest men procurable.

I have to thank, for many courtesies shown me, George Wilkinson, Chief Inspector of Mines; Dudley Michell, First-aid Instructor; W. R. Wilson, general manager of the Crow's Nest Pass Coal Company, and his able engineering staff.

SPECIAL REPORT ON EXPLOSION AT No. 3 MINE, COAL CREEK.

By JAMES ASHWORTH.

On April 8th, in accordance with your telephoned and wired instructions of April 7th, which were as follows: "Confirming my phone message last night, please proceed Fernie and act under instructions which will be sent forward to you there by wire," I left Vancouver at midnight and proceeded direct to Fernie. En route I met your newly appointed Chief Inspector of Mines, George Wilkinson, with whom I was previously acquainted, and we travelled together to Fernie.

On arrival at Fernie we met the funerals of four of the miners, which through some mistake had not been held over until we had had an opportunity to view the bodies. In the afternoon I received your wire and later your confirmatory letter of April 10th, viz.: "I beg to confirm my telegram of yesterday's date, as follows: 'Pursuant to section 73, "Coal-mines Regulation Act," I have appointed you to make a special investigation and report on explosion at No. 3 mine, Coal Creek, on night of 5th instant."

On the afternoon of April 9th I called on W. R. Wilson, the general manager of the Crow's Nest Pass Coal Company, Limited, and communicated your instructions, and also introduced George Wilkinson as your newly appointed Chief Inspector of Mines. In the afternoon we paid a visit to the mine at Coal Creek, and later met Thomas Graham, retiring Chief Inspector of Mines, and the District Inspectors, T. H. Williams (Fernie), George O'Brien (Michel), Robert Strachan (Merrit), and Dudley Michell, of Victoria, First-aid and Mine-rescue Instructor.

Subsequently we met W. Shaw, one of the Albertan Inspectors of Mines, who paid several visits to No. 3 mine.

The No. 3 mine at Coal Creek (*see* Plan 1) is one section of a seam of coal of from 5 to 6 feet thick, which has been operated from the earliest days of the camp. The original entry was, and is still, called No. 2, and was at first ventilated by the fan which now ventilates No. 3 section of the mine; No. 2 section is now ventilated by a separate fan erected in 1911. A third section of this seam of coal, called No. 9, has its entry on the north side of the valley, and is not connected with Nos. 2 and 3 mine-workings underground. Shortly stated, No. 2 mine is working the coal above water adit level, and No. 3 mine the area below.

No. 2 mine is the one in which the disastrous explosion occurred in 1902 and caused the loss of about 130 lives. The place of origin of the 1902 explosion is shown on the accompanying plan—viz., Macdonald's level. Since the 1902 explosion trouble has been experienced from what are known as "bumps" in the central area of the No. 2 mine, which caused several fatal accidents from great upheavals of the floor, falls of roof, and considerable emissions of gas, probably mostly methane. In 1908 a much heavier "bump" than usual occurred, and imprisoned twenty-four men, four of whom lost their lives. After this the major portion of these workings was isolated by a commission sent by the Minister of Mines, and a red line was drawn on the plan, under agreement with the general manager of the Coal Company, that no coal should be wrought within that area, presumably on the conclusion that the pillars in the area wrought under the pillar-and-stall system were too small. Small areas of coal from time to time were worked on a long-wall system, but this system does not seem to have been persisted in sufficiently to demonstrate its effect on this portion of the mine, and it has since remained closed. In parts of Nos. 2, 3, and 9 mines, however, the long-wall system was developed and persistently carried out for some years, but has once more apparently been abandoned.

The Coal Creek mines are superintended by Bernard Caulfield, with Overman John Biggs in charge of the No. 3 portion, and William Lancaster, overman over the No. 2 section. W. R. Puckey was the fireboss on duty at the time of the explosion, with J. Thompson on the previous shift and J. McCourt on the night shift. On April 4th J. McCourt reported at 7 a.m.: "I have examined this mine and found it free from explosive gas and in safe condition." On the following shift J. Thompson reported at 3 p.m.: "I have examined this mine and found a small cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition." On the 11 p.m. shift W. R. Puckey reported: "I have examined this mine and found a little gas in crosscut off counter-level; all other places clear and in safe condition." On the 7 a.m. shift of April 5th J. Thompson reported: "I have examined this mine and found a small cap of gas in return air from face of crosscut to face of counter-level; all other places clear and in safe condition." This report is countersigned by W. R. Puckey, and therefore shows that he was fully aware of the conditions of the mine.

During the morning shift the District Inspector of Mines, T. H. Williams, made his monthly inspection, and reported as follows:—

“Ventilation: Good. Explosive gas: None. There is ½-inch cap in the Main level, counter-level, and crosscut off it.

“Roadways: Good. Timbering: Good.

“Remarks: I measured 29,250 cubic feet of air a minute for the use of forty-three men and seven horses.”

The overman of No. 3 mine, J. Biggs, in his report dated April 5th, says: “I have examined No. 3 mine and found same free from explosive gas and in safe condition. The Inspector made his usual examination of the mine to-day and found the above-mentioned conditions. Afternoon- and night-shift bosses report a little gas in crosscut off counter-level; day-shift fireboss reports all clear. Total men in the mine, 94.”

The last examination made by the No. 3 Mine Gas Committee was on March 17th, as follows: “We, the undersigned, have this day examined the whole of No. 3 mine, and find gas in crosscut off counter; all other places clear. Timber, roof, and sides good.—(Signed.) WM. BIRD and JO. CHARNOCK.”

On February 8th, 1917, George O'Brien, the Michel District Mines Inspector, took Mr. Williams's duty, and reported on No. 3 mine, Coal Creek, as follows:—

“Ventilation: Poor at the face of the South level, but generally good throughout the rest of the mine.

“Explosive gas: Face of South level, crosscut off South level, and counter to South level. These three places were fenced off and the men withdrawn.

“Roadways: Good, but the South level haulage-road was dusty in places.

“Remarks: I measured 35,000 cubic feet of air a minute on the main intake for the use of forty-three men and eight horses. This quantity is divided into two splits: South level split, 25,500 cubic feet a minute for forty men and eight horses, and for the Slope split I measured 6,000 cubic feet a minute for three men and one horse.”

The above quotations from the reports give a good general idea of the ventilation and fire-damp conditions of No. 3 mine at the time of the explosion, and it now remains to ascertain what other conditions may have influenced the explosion.

Immediately before the explosion a trip of empty cars had been lowered down the Main slope, and the hoistman had slackened off the rope to enable the rope-rider to uncouple. The air-locomotive on the main South level, with its trip of empty cars, was on its way inby and probably in motion, and, at a point about 150 feet inside the third charging-station, the air in this level would therefore be in its most dusty condition. It was not customary for the conductor of the trip to go in with the last trip, neither was it unusual for many of the men, when returning from work, to ride out on this last trip. This may have accounted for some of the men being out of their working-places before quitting-time.

The air in the Main level was reported by the District Inspector to be at least 90 per cent. saturated with moisture, and the Main slope wet practically throughout its whole length. The inside length of the level was at times dampened with water which collected in the Main counter-level. The water in the travelling-road down the slope was frozen. No stone dusting was practised.

At the moment of the explosion the miners were preparing to leave their working-places; some were dressing, many had already left their work, and some were nearly out of the mine.

At about 10.20 p.m. the men on the surface were startled by a noise. In the power-house the self-recording dial on the air-compressor showed that the air-line was broken, and one of the engineers on duty saw what appeared to be smoke come out of one of the entries at the other end of the tippie. The hoistman saw the smoke and dust right in front of him, and the weighman on the tippie said that he heard a noise like a trip running away on No. 1 East, saw a big cloud, then a flame and a streak of white vapour. Smoke was very thick on the tippie. He then sent for Mr. Caufield, the superintendent, who was on the spot in about five minutes. Mr. Caufield first gave his attention to the fan which was undamaged, but part of the covering of the shaft was blown off. He then went to the main separation doors between Nos. 2 and 3 mines, found two of them closed and the other partly open. He and a party then went down the slope, and found Malarky's body about 50 feet down. Farther down through the separation doors the

return was blown away; inwards farther down the slope in a crosscut to the left there was a post on fire, and farther inside the crosscut two other posts and boards on fire. The District Inspector, Mr. Williams, and the overman of the mine, Mr. Biggs, then joined the party and went down the travelling-road. The separation doors near the bottom of the slope were found blown out into the return and were replaced by temporary stoppings set up. Farther down the slope one man, Benezeth, was found alive, and two dead men, Gormley (motor conductor) and Machin (the slope rope-rider).

The empty cars in the siding were blown around, and the main air and water pipes were both blown down. Farther along the South level a large fire was discovered in a crosscut where a board stopping was blown inwards towards the return airway. This fire was really three fires and the most dangerous one had to be dug out. Later it was discovered that there was still another fire in the return airway, about 150 feet inside. The first big fall of roof was then found in the Main level, about 1,000 feet in by of the slope. From this point the dangers from fallen roof and gas met with by the exploration party became increasingly difficult, and the advance was systematized by dividing the men into parties of thirty, with five mine officials, and working in six-hour shifts. In this way the exploratory work proceeded from day to day until April 18th, when it was found impossible to get any farther than No. 2 room off the Main level, where both the level and counter-level were completely closed. The Miners' Union was then asked to send representatives to view the situation and consult with the general manager, officials, and Inspectors as to what should be done. At this meeting the decision was unanimous that nothing further could be done at the far end, and that systematic cleaning-up of the mine must be resorted to from the first fall on the level. Two other deputations from the miners were taken in to view the situation before they finally admitted that further exploration for the twelve bodies still unrecovered was impossible. The cleaning-up of the continuous and heavy falls will take a long time, and, therefore, as sufficient evidence appeared to be available to enable the Coroner's jury to arrive at a verdict, the Coroner, Mr. Murray, of Michel, agreed to resume his inquiry on April 19th in the Fernie Court-house at 2.30 in the afternoon. This and the subsequent sittings were not attended by Thomas Graham, the retired Chief Inspector of Mines.

During the day-to-day explorations of No. 3 mine from April 5th to 19th the following bodies and materials were discovered, viz.:—

1. *P. Gormley*.—Very badly burned down to his groin and with many bone fractures; was found with his lamp on the Main slope. He was the conductor of South level dinkey.

2. *Fermin Benezeth*.—Lived for three hours; fractured skull, but no evidence of fire on his body. His working-place was room No. 2 off No. 6 incline. His lamp (No. 1321) was a little damaged; the gauzes were very clean and gas had been burning inside.

3. *Hugh Melarky*.—Pumpman. Found near the top of the Main slope; killed by mechanical force and reported unburned, whose lamp (No. 1313) was found smashed outside the entry, and whose second lamp was said to have been found in the horse pasture many hundred feet from the entry.

4. *J. H. Machin*.—Hair burned, neck broken, and other fractures; was found in the siding at the foot of the slope with his arm round a prop. Rope-rider.

5. *Giacomazzi*.—The partner of Benezeth. His body was not found in the slope, but his lamp (No. 1366) and also his pick were found, the former being smashed up, without inner gauze, and the outer gauze showing signs of having been very hot.

6. *F. Puillandre*.—This man's lamp (No. 1318) was also found in the Main slope; the lamp was undamaged, the glass clean inside. His body was not found. He worked at the face of the Main level, and if his body is not subsequently found there, it is probable he had quitted his working-place about three-quarters of an hour before the regular quitting-time.

7. *Albert Barton*.—The driver of the South level air-dinkey; was found on his engine with a heavy timber across his chest. Burns on head and chest; neck broken. Safety-lamp not recovered. Quantity of coal-dust, but no signs of burns in mouth.

8. *William Puckey*.—Fireboss. Found in parting at foot of No. 6 incline. Hair of head and face singed; burned also on the shoulders and chest. Apparently had been seated on the first of a loaded trip of cars, and had partly leaned over with one leg on car, the other on the ground, and head over the shaft of the horse. Coked dust was jammed into the bonnet of his safety-lamp.

7. *Thomas Checkley*.—Head, face, neck, upper chest, and hands burned; burns on *both legs* and several fractures. His working-place was in No. 1 room off the Main level, and he was found with Puckey and three others, with his lamp intact.

8. *Henri Falip*.—Head, hair, face, and neck much burned; chest and abdomen burned; burn on *right leg* and fractures. Lamp No. 1345; inner gauze had been heated. His working-place was No. 6 incline.

9. *William Bird*.—His working-place was also No. 6 incline, and his burns and wounds were similar to those of H. Falip. His lamp (No. 1302) had the shield bruised, also the gauzes, but these were very clean, excepting the ring-gauze below the glass.

10. *William Silverwood*.—Face, head, chest, and abdomen burned; arms and hands and various fractures; burns on *both legs*. Found with the Puckey group and worked in the cut through from No. 1 to No. 2 room off the Main level with T. Checkley. His lamp was No. 1343 and was only slightly damaged.

11. *Jules Falip*.—Was burned on head, face, hair, chest, and arms, and back of thigh; left humerus broken. He was found in his working-place in No. 1 room off No. 6 incline and his safety-lamp was not recovered.

12. *B. Giacomazzi*.—The partner of Jules Falip; was also found in his working-place. He was badly burned down to his left buttock, and fracture of the frontal bone. His safety-lamp was not recovered.

13. *Frank Smith*.—Hair, head, chest, arms, and back burned. Found in his working-place, No. 3 room off No. 6 incline. His lamp (No. 1316) was undamaged with coked dust in shield.

14. *James Smith*.—Was similarly burned to Frank Smith and in the same room. Both had been at work up to the last. Lamp No. 1310; coked dust in shield.

15. *Joseph Atkinson*.—Hair burned off and burned down to the *knees*. Lamp not recovered. His working-place was No. 5 room off No. 6 incline, and his safety-lamp was not recovered.

16. *Giavona Bosetti*.—Working in No. 5 incline. Whole body burned, many fractures, and neck broken. Safety-lamp not recovered.

17. *Joseph Campbell*.—Working in the crosscut between the inclines Nos. 5 and 6. Badly burned on head, face, neck, arms, and back, and *both legs burned*. Safety-lamp not recovered.

18. *Henry Haydock*.—Working in No. 5 room off No. 6 incline. Head, face, neck, arms, and back badly burned. Both the men in this place had been at work up to the time of the disaster. Safety-lamp not recovered.

19. *W. G. Clarke*.—Both legs broken, *legs badly burned*, also arms and head; neck broken; skull fractured, brains scattered. Working at the face of No. 5 incline with J. Bosetti. Safety-lamp not recovered.

20. *Edward Coates*.—Whole body burned; fracture of left shoulder; jaws crushed. Working in the crosscut between inclines with his partner, Campbell. Safety-lamp not recovered.

21. *John Monks*.—Burns on the back, chest, arms, and face, and some cuts. Found in No. 4 room off No. 6 incline. Lamp No. 1367; dent and coke in shield; both gauzes clean.

22. *J. Stelliga*.—Working with Monks. Burns on the breast, face, *right leg*, and arms. No safety-lamp recovered.

This list shows that a recovery of twenty-two out of thirty-four bodies has been made from the mine, and that most, if not all, of the balance will be found inside No. 6 incline under heavy falls. It is most noticeable that only one horse-body out of the seven at work in the mine was found. Not one body recovered from the mine showed any signs of carbon-monoxide poisoning, which fact is certain proof that all the deaths were of an instantaneous character.

The foregoing careful notes on the bodies and safety-lamps recovered from the mine have been made with the object of discovering some indications which would assist in arriving at a conclusive and convincing decision as to what was the originating cause of the disaster. These are supplemented by other evidence. Thus, firstly, that some of the miners had left their working-places before quitting-time; for instance, Benezeth and G. Giacomazzi, who worked in No. 2 room off No. 6 incline, appear to have come out about three-quarters of an hour before quitting-time. Benezeth's body and safety-lamp were found in the Main slope, and Giacomazzi's safety-lamp and pick were also found there, but not his body. Special search has been made for this body, without success, and yet it does not seem credible that he could have escaped alive from the mine. The cleanness and colouring of the gauzes, however, lend some supposition to

the theory that the presence of gas in their working-place had caused them to leave the mine earlier than usual. Secondly, the safety-lamp of F. Puillandre was also found in the Main slope, but no body. This man worked at the face of the South level, where the reports show that there was gas in the ventilating-current before the shift commenced work, and his lamp (No. 1318) was found with the glass clean inside, undamaged, and with very clean gauzes. So far nothing has been found to throw any light on the mystery of the two missing bodies. Thirdly, two other miners inside of No. 6 incline had come out of their working-places—viz., Silverwood and Checkley—who were found in the Main level along with the fireboss, Puckey. The lamp-gauzes did not apparently show any excessive signs of heat. Fourthly, the direction of force shown in the mine was undoubtedly from an originating point somewhere inside of No. 6 incline. Fifthly, at the foot of No. 1 room off the South level some of the exploring party found evidence of the floor of the level having been lifted, and this, coupled with the fact that the roof near this point and also inby was fallen to such an extent as to completely close both the Main level and the counter, again leads to the conclusion that there had been a "bump" which caused Silverwood and Checkley to quit work. Evidence was given at the inquest that Silverwood and Checkley's working-place was making gas very freely. Sixthly, it was shown by the evidence that the greatest volume of gas was given off from the floor, and in some instances so freely that care had to be taken, when hanging the check or talley inside the car, that gas did not extinguish the lamp (Lynn). This gassy condition extended to the top of the brushing (see section, Plan No. 3).

THE MINE INSIDE OF NO. 6 INCLINE.

From the evidence given at the Coroner's inquest, and other facts already referred to, the reporter has come to the conclusion that the area of No. 3 mine which contains the point of origin of the disaster is inby of No. 6 incline, and at his request the general manager of the Crow's Nest Pass Coal Company, Limited, has had the Plan No. 3 prepared on a larger scale to show more distinctly the conditions as to ventilation.

This plan shows that this part of the mine is a disturbed area, and that the coal-seam does not lie so conformably as in the more outby area. First, there is a downthrow fault of 36 inches, then an area of softer coal, and close to the face another faulting which is an upthrow of 30 inches. The two faults appear to converge in the direction of Nos. 7 and 4 inclines, where in the latter the brushing coal was found to be 8 feet thick.

On the morning shift of April 5th all the rooms were at work, and one of the miners at the face of the Main level, named Lane, who had been a fireboss, said he found a $\frac{1}{2}$ -inch cap, and thought it safe to work. He also added that this cap increased towards the end of the shift to $\frac{3}{4}$ inch, and that he did not report this increase to the fireboss. He thought that $\frac{3}{4}$ inch represented 3 per cent. of methane or fire-damp. He was at work when Mr. Williams, the Inspector of Mines, passed through the mine in the morning, and also when another Inspector of Mines, G. O'Brien, withdrew all the men out of the counter, the crosscut, and the level on February 8th, 1917, when the cap was about the same size. Mr. O'Brien evidently thought that, as the whole volume of air was charged to this extent with gas, it came within the range of the heading of "Explosive Gas," which is one of the heads under which he has to make a specific report in accordance with section 77 of the "Coal-mines Regulation Act." This report was posted up outside No. 3 mine and was for the information of all employees.

There is no record of any investigation having been made to ascertain from what particular source this extra volume of gas originated, but it is probable that it was within the disturbed area shown on Plan 2.

EXPLOSIVE GAS.

This term as used is a most misleading one, and requires the most serious consideration. It is not found in the "Coal-mines Regulation Act," and there is no history to show how it originated. The Act of Parliament uses the term "inflammable gas," but there is no official definition of that term either. The practical inference has been that where there is no kind of explosive being used a man is safe to continue at work until gas actually explodes in his lamp. Your reporter has on previous inquiries into colliery disasters attempted to ascertain the size of cap which officials and workmen have described as a "small cap," but without any satisfactory result, and therefore he is now of opinion that the time has arrived when this question should

be settled. He is satisfied that either a further explanation of the words "explosive gas" should be enacted, or deleted altogether. A fire-damp or inflammable-gas cap should be stated in parts of an inch, in preference to percentages. One instance of this argument in practical application may be quoted from the No. 3 mine; thus, on the 9th day of March, 1917, Mr. Williams, the Inspector of Mines, in his official report says: "Explosive gas: None"; but under "General remarks" he reports a small cap of gas in the Main level and counter. Two of the firebosses report: "A small cap of gas in return air from face of Main level round to counter-level; all other places clear and in safe condition." The other fireboss reports: "I have examined this mine and found it free from *explosive gas* and in safe condition. A small cap of gas in return air from Main level round to counter-level."

This appears to have been the chronic condition of this part of the mine, and the reports are initialled by the overman. The overman, in his report to the manager, says: "I have examined No. 3 mine and found same free from explosive gas and in safe condition. The Inspector made his usual examination and found the above-mentioned conditions. Firebosses report No. 3 mine as stated above."

These quotations show clearly that "explosive gas" is the term to avoid, and that a "small cap of gas" is only worth passing notice.

None of these reports state the origin of the gas which thus charged the whole volume of air at the points named, but the gas must have been in the air before reaching the face of the Main level. Was it from a "blower" within the faulted area?

In a mine like No. 3, which creates a fine and easily ignitable dust from the working of the coal, it may now be asked: What is an *explosive* mixture of air, fire-damp, and coal-dust?

It was stated during the inquest that 1 ton of this coal gave off 3,669 cubic feet of occluded gas; it was also stated that experiments had been made to show what volume of gas was given off whilst the mine was at work and also when not at work. These experiments showed that the return air contained 1.77 per cent. of methane when at work and 1.38 per cent. when not at work, which does not seem to be a very material difference.

With the foregoing facts in mind, it is clear that more safety provision is absolutely necessary, and your reporter would most strongly suggest that the words "explosive gas" and "small caps" be entirely eliminated, and that all reports as to inflammable gases be made in parts of an inch, with a height of cap fixed at which the miners must be withdrawn from the mine, and the special examinations made in accordance with the present "Coal-mines Regulation Act, 1911." For many years an illustrated card issued by the British Home Office Mines Department has been in the hands of the inspectorate of British Columbia and distributed freely "with the compliments of the Minister of Mines," but apparently without any practical result. These cards show the heights of cap produced by $1\frac{1}{2}$, 2, $2\frac{1}{2}$, and 3 per cent. of fire-damp (Figs. 1 to 4), and the accompanying text explains that when a complete cap of 2 per cent., however faint, is discovered on the lowered flame, men should withdraw at once from the working-place and inform the fireman or other official responsible for the ventilation. The card in question is based on tests made with oil as fuel, and therefore it may require some correction for British Columbia mines, which use the benzene or gasolene in safety-lamps in the majority of cases.

Whilst on the subject of safety-lamps, attention may be called to the fact that most of the gas-testing apparatus used throughout the Province is very inefficient, and therefore almost useless as a safeguard against the accidental issuance of a faulty safety-lamp.

STOPPINGS AND DOORS.

The fact was elicited during the inquiry that with a volume of air of over 53,000 cubic feet at the fan-shaft, only 13,000 was found at the far end of the levels, thus showing a leakage of 40,000 cubic feet. This calls for serious attention to the class of air stopping generally used, which is usually made of boards, but sometimes it is of rock and dirt. It seems highly desirable that the stoppings on main roads should be of a more permanent character, so as to prevent an excessive leakage of air.

As regards doors, one door and a canvas sheet will satisfy the provisions of the 1911 Act of Parliament, but the inefficiency of this arrangement was demonstrated at the Reserve Mine explosion, and your reporter strongly suggests that at least two doors should be made compulsory, and not left to the opinion of the Chief Inspector of Mines.

THE QUANTITY OF AIR PER MAN.

Your reporter would suggest a revision of this rule of the present Act of Parliament, as it is obvious that the conditions in a mine which is only just commencing to work a coal-seam are entirely different to those of a mine which is a mile or more from the entry, as in the case of No. 3 mine at Coal Creek.

NUMBER OF MEN IN EACH SPLIT OF AIR.

In view of the gaseous character of the coal-seams of the Crowsnest Pass coalfield, your reporter would suggest that thirty-five men be the limit in each split of air, instead of seventy as in the present Act of Parliament.

THE LOCALIZATION OF AN EXPLOSION.

For a great many years the opinion was almost universal that the watering of the roadways of a mine or wet zones was capable of controlling the extension of an explosion, but this contention has now been practically abandoned, and has given place to stone-dusting. It has not yet been proved that in a case like No. 3 mine at Coal Creek it would have effected any saving of life. There is not a doubt in your reporter's mind that the principal factor in the explosion in No. 3 mine was fire-damp, which, after its own ignition and that of the floating coal-dust, swept through the working-places where neither water nor stone-dust could be practically applied. If stone-dust had been applied on the main South level, there would, however, have been a probability that less damage would have been done to the mine roadways and the men in the slope might have escaped alive. Under similar conditions I should strongly advise that stone-dusting should be adopted on the main haulage-ways where they are not naturally wet as in No. 3 slope.

THE METHODS OF EXTRACTING COAL.

Your reporter would also suggest to you that the mode of extracting or working a coal-seam should be taken into consideration as having a very great influence on the safety of the mine and of the persons employed. Thus, in the past history of the No. 3 mine, all the disasters have occurred whilst the pillar-and-stall system was in vogue, but neither serious "bumps" nor outbursts of gas have occurred whilst the long-wall system of work was practised. This immunity from disaster is doubtless mainly due to three factors: Firstly, that long-wall faces are much more easily ventilated and require less brattice-cloth than the pillar-and-stall method; secondly, there is a less area of the mine open for an equal output; and, thirdly, that gases in the floor and roof are given off with more regularity and much less liability to "bumps."

THE CORONER'S INQUEST.

Some little friction arose in the early stages, but this was settled by the appointment of C. C. Murray, the Coroner of the Michel District, and a fresh jury, who viewed an exhumed body and immediately proceeded to take evidence on April 19th, and continued doing so until the 24th of that month, when the jury announced that they had heard sufficient evidence to come to a decision. They later brought in their verdict, viz.: "That John Monks, *et al.* came to their death at Coal Creek on April 5th, and hereby find that those men met their death by an explosion the first cause of which is unknown to us by the evidence adduced. We, however, would recommend from the evidence received that the single shift would, if practicable, be a great factor in preventing an explosion such as this."

By the courtesy of the Coroner your special investigator was permitted to question the witnesses, and obtain much of the information which is embodied in this his report.

The Coroner further invited all and sundry to bring out any facts which affected the deaths of the thirty-four men killed.

The Crow's Nest Pass Coal Company, Limited, was represented by the general manager, W. R. Wilson; their solicitor, Sherwood Herchmer; and many of the officials. Your inspectorate staff was represented by George Wilkinson, Chief, and W. R. Williams, George O'Brien, and Robert Strachan, District Inspectors. The Miners' Union was represented by T. France, secretary, Mr. Biggs, and Mr. O'Neil, solicitor.

The inquest was resumed on the above date as a consequence of the representations made to the Coroner by myself and your Chief Inspector of Mines that it was impossible to recover

any more bodies for a considerable time; that there was, we thought, sufficient evidence available to enable the jury to come to a conclusion; and later, as a matter of fact, they announced that they were prepared to consider their verdict, whilst Mr. Caufield, the superintendent, was still on the witness stand.

CONCLUSION.

The evidence produced to the jury was brought up as closely as possible to the seat of the origin of the explosion (*see* Plan No. 3), where both the Main level and counter were completely blocked up by fallen roof. The indications were, however, so unmistakable as to the direction of force that every one was convinced that the point of origin was inby of No. 6 incline.

The very dangerous condition which was proved to have existed, particularly at the face of the Main level, the counter, and especially in the crosscut where the coal was soft and producing gas freely, point to this part of the mine as the point of origin.

Now as to the cause: Your special investigator has come to the conclusion, from his personal experimental work on safety-lamps when exposed to mixtures of fire-damp and coal-dust in low velocities of a ventilation-current, that this disastrous explosion was originated by an overheated safety-lamp igniting and exploding the surrounding fire-damp and fine coal-dust. When considering the safety of a safety-lamp, it must not be lost sight of that coal-dust is so finely divided that it will pass through the meshes of a safety-lamp gauze, and also that every such particle of dust contains its own volume of explosive gas. Such dust is therefore as dangerous as fire-damp under conditions similar to those which were probably present when ignition took place. The other possibility is that a loaded car may have been off the track, and that a safety-lamp was broken whilst replacing it; but this is not such a likely occurrence as the former suggestion.

Finally, the most important lesson taught by this explosion is that a maximum height of fire-damp cap must be fixed to compel the miners to withdraw, or be withdrawn, from the mine or part of the mine, and a permissible height of cap must also be fixed for those places where permissible explosives are in use.

In the course of the inquiry it transpired that many of the "certificated" miners never tested for gas when entering their working-places, and never during the shift, and therefore it seems desirable that the firebosses during their rounds of inspection should compel the miners to make tests for fire-damp whilst they are present. Some miner's eyes are diseased and incapable of seeing a dangerous cap on the flame of a safety-lamp.

EXPLOSION AT No. 6 MINE, CUMBERLAND.

REPORT BY GEO. WILKINSON, CHIEF INSPECTOR OF MINES.

I have the honour to submit the following report on the explosion which occurred on June 3rd, 1917, in the No. 6 mine, Comox Colliery, operated by the Canadian Collieries (Dunsmuir), Limited, resulting in the loss of four lives:—

Upon receipt of a telephone message from Mr. Fagan, chief accountant of the Canadian Collieries (Dunsmuir), Limited, about 2 p.m., Sunday afternoon, June 3rd, 1917, to the effect that there had been an explosion in No. 6 mine at Cumberland and that several men were known to be killed, I immediately prepared to leave for Cumberland by automobile, arriving there about 10.30 p.m.

Upon arrival there I was informed that the explosion had been local and only a very small amount of damage had been done, although it had resulted in an unfortunate loss of four lives. All the bodies had been taken out when I arrived there and all other work suspended until morning.

On Monday morning I visited the scene of the accident, accompanied by Henry Devlin, Inspector of Mines for Cumberland District; Dudley Michell, Instructor in First-aid and Mine-rescue Work for the British Columbia Government; Thomas Graham, general superintendent, Canadian Collieries (Dunsmuir), Limited; W. R. Freeman, superintendent of the Comox Colliery; Hugh Sloan, mine manager, No. 6 mine; Thos. Mordy, overman, No. 6 mine; and B. F. Andrews, resident engineer, Canadian Collieries (Dunsmuir), Limited.

SHORT DESCRIPTION OF No. 6 MINE.

No. 6 mine is opened by a shaft 265 feet deep; the workings of this mine consist of pillar-and-stall and long-wall work. Mining in the long-wall section is done by a Sullivan electric coal-cutter, type C.E. 7, alternating current. The average thickness of the coal-seam is about 4 feet, but the coal contains several bands of rock and is of a hard nature, with sandstone roof and floor. Sufficient height is obtained by brushing 3 feet of bottom. On the north side of the shaft a good field of coal has been tapped by driving a rock tunnel through a 50-foot upthrow fault. Mining is done in this district by electric coal-cutter. Pillars are being extracted on the No. 1 incline, west of the shaft, also on the main East levels.

LOCATION OF ACCIDENT.

The explosion occurred in what is known as Fat Sing's machine section, a new piece of long-wall work started inside of a fault on the No. 6 East level off hoist incline; this consists of a long-wall face of approximately 500 feet in length, opened out by four roadways and the level.

THE APPARENT CONDITION OF THE MINE BEFORE THE EXPLOSION.

To give this is appended the following reports:—

- (a.) Firebosses' daily reports from May 20th to June 3rd, 1917.
- (b.) Inspectors' reports for March, April, and May, 1917.
- (c.) Gas Committee reports for March, April, and May, 1917.

TRANSCRIPT OF FIREBOSSSES' REPORT-BOOK.

Date: May 20th, 1917. Time: 7 a.m.

I have examined all roadways, doors, and curtains leading to working-places on East and West sides and found same in good order.

(Signed.) DUNCAN THOMPSON; J. B.

Date: May 20th. Time: 2.45 p.m.

I have examined the working-places and roadways of Big Hoist, Hero's, and East Side section and found same in good condition.

(Signed.) JOHN BROWN.

Date: May 20th. Time: 3 p.m.

I have examined all working on the incline and found all clear and in good order.

(Signed.) THOS. RICHARDS.

Date: May 21st. Time: 7 a.m.

Barometer: 29.7. Temperature: 45.

I have examined all working-places on East and West sides and found them free from gas and in good order, with the exception of a little gas in slope, Rock Tunnel section.

(Signed.) DUNCAN THOMPSON.

Date: May 21st. Time: 7 a.m.

Barometer: 29.7. Temperature: 45.

I have examined all working-places and roadways on the incline, and found gas in No. 4 stall off East level; the others clear.

(Signed.) THOS. RICHARDS.

Date: May 21st. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 21st. Time: 3 p.m.

I have examined working-places, Nos. 1 and 2 West, and found them safe and clear of gas. Timbering and ventilation good.

(Signed.) H. LEIGHTON.

Date: May 21st. Time: 3 p.m.

I have examined the working-places and roadways in Rock Tunnel and found all safe and clear, except for a little gas in slope. Timbering and ventilation good.

(Signed.) J. E. SPICER.

Date: May 21st. Time: 3 p.m.

I have examined all working-places in Big Hoist section and found same in good condition and free from gas.

(Signed.) J. BIGGS; F. B.

Date: May 21st. Time: 12 p.m.

I have examined all working-places on incline and Rock Tunnel and found all clear of gas, except a little in slope in Rock Tunnel.

(Signed.) T. LEEMAN.

Date: May 21st. Time: 12 p.m.

I have examined the working-places and roadways in Big Hoist section and found same in good order and free from gas.

(Signed.) F. BOBBA.

Date: May 21st. Time: 12 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 22nd. Time: 7 a.m.

Barometer: 29.7. Temperature: 48.

I have examined all working-places on East and West sides and found them free from gas and in good order, except a little gas in slope road, Rock Tunnel section.

(Signed.) HUGH SLOAN; DUNCAN THOMPSON.

Date: May 22nd. Time: 7 a.m.

Barometer: 29.7. Temperature: 48.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 22nd. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 22nd. Time: 3 p.m.

I have examined all working-places in Big Hoist section and found same in good condition and free from gas.

(Signed.) J. BIGGS; F. B.

Date: May 22nd. Time: 3 p.m.

I have examined all working-places and roadways in Rock Tunnel. I found a little gas in East slope; all others clear and safe. Timbering and ventilation good.

(Signed.) J. E. SPICER; T.L.

Date: May 22nd. Time: 3 p.m.

I have examined working-places, Nos. 1 and 2 West, and found them safe and clear of gas. Timbering and ventilation good.

(Signed.) H. LEIGHTON; J. B.

Date: May 22nd. Time: 12 p.m.

I have examined all workings on incline, Rock Tunnel, and found a little gas in slope, Rock Tunnel; all other places clear.

(Signed.) T. LEEMAN.

Date: May 22nd. Time: 12 p.m.

I have examined the working-places and roadways in Big Hoist section and found same in good order and clear of gas.

(Signed.) F. BOBBA.

Date: May 22nd. Time: 12 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) HUGH SLOAN; JOHN BROWN.

Date: May 23rd. Time: 7 a.m.

Barometer: 29.6. Temperature: 42.

I have examined all working-places on East and West sides and found them free from gas and in good order, except a little gas in Fat Sing's machine wall, Big Hoist section.

(Signed.) DUNCAN THOMPSON.

Date: May 23rd. Time: 7 a.m.

Barometer: 29.6. Temperature: 42.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) HUGH SLOAN; THOS. RICHARDS.

Date: May 23rd. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS; T.L.

Date: May 23rd. Time: 3 p.m.

I have examined all working-places in Big Hoist section and found them in good condition and free from gas.

(Signed.) J. BIGGS; F.B.

Date: May 23rd. Time: 3 p.m.

I have examined all working-places and roadways in Rock Tunnel and found a little gas in slope; all others safe and clear.

(Signed.) J. E. SPICER; T.L.

Date: May 23rd. Time: 3 p.m.

I have examined working-places in Nos. 1 and 2 West and found them safe and clear of gas. Miss-shot No. 82; place, Hero section. Timbering and ventilation good.

(Signed.) HY. LEIGHTON; J. B.

Date: May 23rd. Time: 11 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 23rd. Time: 11 p.m.

I have examined all working-places on incline and Rock Tunnel and found a little gas in slope; all other places clear and in good working-order.

(Signed.) T. LEEMAN; HUGH SLOAN.

Date: May 23rd. Time: 11 p.m.

I have examined the working-places and roadways in Big Hoist section and found same in good order and free from gas.

(Signed.) F. BOBBA.

Date: May 24th. Time: 6 a.m.

I have examined roadways, doors, and curtains leading to working-places in Rock Tunnel, also Big Hoist section, and found them in good order.

(Signed.) DUNCAN THOMPSON; HUGH SLOAN; T. M.

Date: May 25th. Time: 7 a.m.

Barometer: 29.5. Temperature: 50.

I have examined all working-places and roadways on East and West sides and found them free from gas and in good order, excepting a little gas in slope roadway, Rock Tunnel section.

(Signed.) DUNCAN THOMPSON.

Date: May 25th. Time: 7 a.m.

I have examined all working-places and the roadways on the incline and found them clear.

(Signed.) THOS. RICHARDS; HUGH SLOAN.

Date: May 25th. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 25th. Time: 3 p.m.

I have examined working-places and roadways, Nos. 1 and 2 West, and found them safe and clear of gas. Timbering and ventilation good.

(Signed.) HY. LEIGHTON; J. B.

Date: May 25th. Time: 3 p.m.

I have examined the working-places and roadways in Rock Tunnel. I found a little gas in slope; all others clear and safe. Timbering and ventilation good.

(Signed.) J. E. SPICER.

Date: May 25th. Time: 3 p.m.

I have examined all working-places behind Big Hoist and found same in good condition and free from gas.

(Signed.) J. BIGGS; F. B.

Date: May 25th. Time: 12 p.m.

I have examined all workings and roadway, incline and Rock Tunnel, and found a little gas in slope; all other places clear.

(Signed.) T. LEEMAN.

Date: May 25th. Time: 12 p.m.

I have examined the working-places and roadways in Big Hoist section and found same in good order and free from gas.

(Signed.) F. BOBBA.

Date: May 25th. Time: 12 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 26th. Time: 7 a.m.

Barometer: 29.6. Temperature: 50.

I have examined all working-places and roadways on East and West sides and found them free from gas and in good order, except a little gas at face off Fat Sing's machine wall, Big Hoist section.

(Signed.) DUNCAN THOMPSON.

Date: May 26th. Time: 7 a.m.

Barometer: 29.6. Temperature: 50.

I have examined all places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS; HUGH SLOAN; T. M.

Date: May 26th. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 26th. Time: 3 p.m.

I have examined all working-places in Big Hoist section and found same in good order and free from gas.

(Signed.) J. BIGGS; F. B.

Date: May 26th. Time: 3 p.m.

I have examined the working-places and roadways in Rock Tunnel and found a little gas in slope; all others clear and safe. Timbering and ventilation good.

(Signed.) J. E. SPICER.

Date: May 26th. Time: 3 p.m.

I have examined working-places and roadways, Nos. 1 and 2 West, and find them safe and clear of gas. Timbering and ventilation good.

(Signed.) HY. LEIGHTON; F. B.

Date: May 26th. Time: 11 p.m.

I have examined the working-places in Big Hoist section and found same in good order and free from gas. Roadways, timbering, and ventilation good.

(Signed.) F. BOBBA.

Date: May 26th. Time: 11 p.m.

I have examined all working-places, roadways, incline, and Rock Tunnel; found a little gas in the slope; all other places clear.

(Signed.) T. LEEMAN.

Date: May 26th. Time: 11 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 27th. Time: 4 a.m.

I have examined roadways, doors, and curtains on East and West sides and found same in good order, except No. 2 West level door (requires repairing).

(Signed.) DUNCAN THOMPSON; F. B.

Date: May 27th. Time: 2.30 p.m.

I have examined the working-places and roadways in Big Hoist section and Rock Tunnel and found same in good order and free from gas.

(Signed.) F. BOBBA.

Date: May 27th. Time: 3 p.m.

I have examined all workings and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 28th. Time: 7 a.m.

Barometer: 29.55. Temperature: 50.

I have examined all working-places and roadways on East and West sides and found them free from gas and in good order, except a little gas in slope roadway, Rock Tunnel section.

(Signed.) DUNCAN THOMPSON; F. B.

Date: May 28th. Time: 7 a.m.

Barometer: 29.55. Temperature: 50.

I have examined all working-places and roadways on the incline and found gas in the East level; the others clear.

(Signed.) THOS. RICHARDS; J. B.

Date: May 28th. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 28th. Time: 3 p.m.

I have examined all working-places and roadways in Big Hoist section and found same in good order and free from gas. (Miss-shot in Jap's place, Check No. 18.)

(Signed.) F. BOBBA.

Date: May 28th. Time: 3 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 28th. Time: 3 p.m.

I have examined all working-places and roadways in Rock Tunnel. I found a little gas in W. Hutton's face and also in slope; all others safe and clear. Timbering good and ventilation fair.

(Signed.) J. E. SPICER.

Date: May 28th. Time: 12 p.m.

I have examined all working-places on incline and found all clear of gas. Roadway ventilation in good condition.

(Signed.) T. LEEMAN.

Date: May 28th. Time: 12 p.m.

I have examined working-places, Nos. 1 and 2 West and Rock Tunnel, and found them safe and clear of gas, except Rock Tunnel slope. Timbering and ventilation good.

(Signed.) HY. LEIGHTON.

Date: May 28th. Time: 12 p.m.

I have examined all working-places in Big Hoist section and found same in good order and free from gas.

(Signed.) J. BIGGS; T. M.

Date: May 29th. Time: 7 a.m.

Barometer: 29.5. Temperature: 50.

I have examined all working-places and roadways on East and West sides and found them free from gas and in good order, except a little gas at face off Fat Sing's machine wall, Big Hoist section.

(Signed.) DUNCAN THOMPSON; F. B.; T. L.

Date: May 29th. Time: 7 a.m.

Barometer: 29.5. Temperature: 50.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS; HUGH SLOAN.

Date: May 29th. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 29th. Time: 3 p.m.

I have examined all working-places and roadways in Rock Tunnel and found a little gas in slope; all other places clear and in good order.

(Signed.) T. LEEMAN; T. M.

Date: May 29th. Time: 3 p.m.

I have examined the working-places and roadways in Big Hoist section and found same in good order and free from gas.

(Signed.) F. BOBBA.

Date: May 29th. Time: 3 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 29th. Time: 12 p.m.

I have examined all working-places on incline. I found a little gas in No. 4 place in Level Dip section; all others clear and safe. Timbering and ventilation good.

(Signed.) J. E. SPICER.

Date: May 29th. Time: 12 p.m.

I have examined working-places and roadways, Nos. 1 and 2 West and Rock Tunnel, and find them safe and clear of gas, except Rock Tunnel slope. Timbering and ventilation good.

(Signed.) HY. LEIGHTON.

Date: May 29th. Time: 12 p.m.

I have examined all working-places behind Big Hoist and found same in good condition and free from gas.

(Signed.) J. BIGGS.

Date: May 30th. Time: 7 a.m.

Barometer: 29.6. Temperature: 48.

I have examined all working-places and roadways on East and West sides and found them free from gas and in good order, except a little gas in roadway of Rock Tunnel slope.

(Signed.) DUNCAN THOMPSON; J. B.

Date: May 30th. Time: 7 a.m.

Barometer: 29.6. Temperature: 48.

I have examined all working-places and roadways on the incline and found gas in No. 5 stall; the others all clear.

(Signed.) THOS. RICHARDS; T. M.

Date: May 30th. Time: 1 p.m.

I have examined all working-places and roadways on the incline and found gas in No. 5 stall, East level; the others all clear.

(Signed.) THOS. RICHARDS.

Date: May 30th. Time: 3 p.m.

I have examined all working-places in Rock Tunnel and found a little gas in slope; all other places clear. Roadway good; ventilation fair.

(Signed.) T. LEEMAN.

Date: May 30th. Time: 3 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 30th. Time: 3 p.m.

I have examined all working-places and roadways in Big Hoist section and found same in good order and free from gas.

(Signed.) F. BOBBA.

Date: May 30th. Time: 12 p.m.

I have examined the working-places and roadways on incline and found all safe and clear of gas. Timbering good; ventilation good.

(Signed.) J. E. SPICER.

Date: May 30th. Time: 12 p.m.

I have examined all working-places behind Big Hoist and found same in good condition and free from gas.

(Signed.) J. BIGGS.

Date: May 30th. Time: 12 p.m.

I have examined working-places and roadways, Nos. 1 and 2 West and Rock Tunnel, and find them safe and clear of gas, except slope, Rock Tunnel. Timbering good; ventilation fair.

(Signed.) HY. LEIGHTON.

Date: May 31st. Time: 7 a.m.

Barometer: 29.7. Temperature: 50.

I have examined all working-places and roadways and found them free from gas and in good order, except a little gas in Hutton's place and slope roadway.

(Signed.) DUNCAN THOMPSON; F. B.

Date: May 31st. Time: 7 a.m.

Barometer: 29.7. Temperature: 50.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS; T. M.

Date: May 31st. Time: 3 p.m.

I have examined the working-places and roadways in Big Hoist section and found same in good order and free from gas.

(Signed.) F. BOBBA.

Date: May 31st. Time: 3 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: May 31st. Time: 3 p.m.

I have examined all working-places in Rock Tunnel and found a little gas in slope; all other places clear. Roadway good; ventilation fair.

(Signed.) T. LEEMAN.

Date: May 31st. Time: 3 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: May 31st. Time: 12 p.m.

I have examined all working-places in Big Hoist section and found same in good condition and free from gas.

(Signed.) J. BIGGS.

Date: May 31st. Time: 12 p.m.

I have examined working-places and roadways, Nos. 1 and 2 West and Rock Tunnel, and find them safe and clear of gas, except Rock Tunnel slope. Ventilation fair; ventilation good.

(Signed.) HY. LEIGHTON.

Date: May 31st. Time: 12 p.m.

I have examined all working-places and roadways on incline and found all safe and clear of gas. Timbering and ventilation good.

(Signed.) J. E. SPICER.

Date: June 1st. Time: 7 a.m.

Barometer: 29.5. Temperature: 50.

I have examined all working-places and roadways and found them free from gas and in good order, except a little gas in Rock Tunnel slope.

(Signed.) DUNCAN THOMPSON; F. B.; T. M.

Date: June 1st. Time: 7 a.m.

Barometer: 29.5. Temperature: 50.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: June 1st. Time: 3 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: June 1st. Time: 3 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West and found same in good condition and free from gas.

(Signed.) JOHN BROWN; HUGH SLOAN.

Date: June 1st. Time: 3 p.m.

I have examined all working-places in Rock Tunnel and found a little gas in slope; all other places clear. Roadway good; ventilation fair.

(Signed.) T. LEEMAN.

Date: June 1st. Time: 3 p.m.

I have examined the working-places and roadways in Big Hoist section and found same in good order and clear of gas.

(Signed.) F. BOBBA.

Date: June 1st. Time: 12 p.m.

I have examined all working-places in Big Hoist section and found same in good condition and free from gas.

(Signed.) J. BIGGS.

Date: June 1st. Time: 12 p.m.

I have examined all working-places and roadways on incline and found all safe and clear of gas. Timbering and ventilation fair.

(Signed.) J. E. SPICER.

Date: June 1st. Time: 12 p.m.

I have examined working-places and roadways, Nos. 1 and 2 West and Rock Tunnel, and find them safe and clear of gas, except slope, Rock Tunnel. Timbering good; ventilation fair.

(Signed.) HY. LEIGHTON.

Date: June 2nd. Time: 7 a.m.

Barometer: 29.5. Temperature: 50.

I have examined all working-places and roadways and found them free from gas and in good order, except a little gas in slope roadway at face of Brown's level, Rock Tunnel section.

(Signed.) DUNCAN THOMPSON; F. B.; T. L.

Date: June 2nd. Time: 7 a.m.

Barometer: 29.5. Temperature: 50.

I have examined all workings and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: June 2nd. Time: 2 p.m.

I have examined all working-places and roadways on the incline and found all clear.

(Signed.) THOS. RICHARDS.

Date: June 2nd. Time: 3 p.m.

I have examined the working-places and roadways in Big Hoist section and found same clear of gas and in good order.

(Signed.) F. BOBBA.

Date: June 2nd. Time: 3 p.m.

I have examined the working-places and roadways of Nos. 1 and 2 West section and found same in good condition and free from gas.

(Signed.) JOHN BROWN.

Date: June 2nd. Time: 3 p.m.

I have examined all working-places in Rock Tunnel and found a little gas in slope; all other places clear. Roadway good; ventilation fair.

(Signed.) T. LEEMAN.

Date: June 2nd. Time: 11 p.m.

I have examined all working-places on incline and found all safe and clear of gas. Timbering and ventilation good; roadways safe.

(Signed.) J. E. SPICER.

Date: June 2nd. Time: 11 p.m.

I have examined all working-places in Big Hoist section and found same in good order and free from gas.

(Signed.) J. BIGGS.

Date: June 2nd. Time: 11 p.m.

I have examined working-places and roadways, Nos. 1 and 2 West, and find them safe and clear of gas. Timbering and ventilation good.

(Signed.) HY. LEIGHTON.

Date: June 3rd. Time: 4 a.m.

I have examined roadways, doors, and curtains in Big Hoist section, Rock Tunnel, and No. 1 West and found same in good order.

(Signed.) DUNCAN THOMPSON.

Date: June 3rd. Time: 8 a.m.

I have examined all working-places in Rock Tunnel and found a little gas in slope; all other places clear.

(Signed.) T. LEEMAN.

INSPECTORS' REPORTS FOR MARCH, APRIL, AND MAY, 1917.

I hereby give notice that I have this day examined the underground workings of that part of the Canadian Collieries (Dunsmuir), Limited, Colliery known as No. 6 mine, and find the following conditions to prevail therein:—

Part of mine examined: All the mine. Ventilation: Good, showing 43,375 cubic feet of air a minute passing into the mine, divided into three splits.

Explosive gas: Found a small quantity in No. 1 slant off the West level, No. 1 dip; and in No. 2 slant off No. 5 East level.

Roadways: In fair order. Timbering: In fair condition.

Remarks: In No. 1 split there was 14,500 cubic feet of air a minute passing for the use of thirty-one men and three mules. In No. 2 split there was 16,875 cubic feet of air a minute passing for the use of sixty-three men and seven mules. In No. 3 split there was 12,000 cubic feet of air a minute passing for the use of forty-four men and five mules.

Dated at Cumberland, B.C., this 13th day of March, 1917.

HENRY DEVLIN,
Inspector of Mines.

I hereby give notice that I have this day examined the underground workings of that part of the Canadian Collieries (Dunsmuir), Limited, Colliery known as No. 6 mine, and find the following conditions to prevail therein:—

Part of mine examined: All the mine. Ventilation: Good, showing 40,975 cubic feet of air a minute passing into the mine, divided into three splits.

Explosive gas: Found a little issuing from a feeder in the roof in No. 2 level off No. 2 dip.

Roadways: In fair order. Timbering: In fairly good order.

Remarks: In No. 1 split there was 15,000 cubic feet of air a minute passing for the use of thirty-two men and four mules. In No. 2 split there was 15,975 cubic feet of air a minute passing for the use of forty-seven men and eight mules. In No. 3 split there was 10,000 cubic feet of air a minute passing for the use of forty-seven men and five mules.

Dated at Cumberland, B.C., this 11th day of April, 1917.

HENRY DEVLIN,
Inspector of Mines.

I hereby give notice that I have this day examined the underground workings of that part of the Canadian Collieries (Dunsmuir), Limited, Colliery known as No. 6 mine, and find the following conditions to prevail therein:—

Part of mine examined: All the mine. Ventilation: Good, showing 38,850 cubic feet of air a minute passing into the mine, divided into three splits.

Explosive gas: None found. Roadways: In fair order. Timbering: In fairly good condition.

Remarks: In No. 1 split there was 10,500 cubic feet of air a minute passing for the use of sixteen men and three mules. In No. 2 split there was 15,750 cubic feet of air a minute passing for the use of fifty men and seven mules. In No. 3 split there was 12,600 cubic feet of air a minute passing for the use of forty-three men and six mules.

Dated at Cumberland, B.C., this 7th day of May, 1917.

HENRY DEVLIN,
Inspector of Mines.

GAS COMMITTEE REPORTS FOR MARCH, APRIL, AND MAY, 1917.

March 22nd. I have examined all No. 6 mine in accordance with General Rule 37, C.M.R.A., and found all clear of gas, ventilation good, timbering good, and all in safe condition.

NAT BEVIS.

April 17th. I have examined all No. 6 mine of Cumberland in accordance with General Rule 37, C.M.R.A., and found all clear of gas, ventilation good, timbering good, and in general in safe working condition.

NAT BEVIS.

May 17th. I have examined all No. 6 mine in accordance with General Rule 37, C.M.R.A., and found all clear of gas, except a slight cap in dip in Rock Tunnel district, but I do not consider this dangerous. Ventilation good, timbering good, and all in safe working condition.

NAT BEVIS.

CONDITION OF MINE AFTER EXPLOSION.

The mine was practically undamaged; two or three temporary stoppings blown out and a few curtains down was the only damage done; these were repaired in about one hour after the explosion occurred. The surveyor's transit which was standing on the level some distance outside was blown over by the force of the blast and broken.

DETAILED CONDITION AT FACE OF SECTION WHERE ACCIDENT OCCURRED.

No. 1 Roadway.—Coal undercut, but not shot down; signs of coking; timber burnt a little and pitch on timbers burned; on low side of this place was a fault.

No. 2 Roadway.—Coal undercut, but not shot down; signs of coking on coal cuttings from machine-mining.

No. 3 Roadway.—Coal undercut and shot down; no signs of coking; everything at face undisturbed.

No. 4 Roadway.—Conditions same as before explosion.

Face of Level.—Conditions same as before explosion.

LINES OF FORCE OF EXPLOSIVE BLAST.

The lines of force were outward, although very slight; there were small amounts of debris scattered outwards and the parts of the surveyor's transit were blown outwards.

DEDUCTIONS AS TO THE INITIAL POINT OF EXPLOSION.

Conditions found point to the face of No. 3 roadway as being the initial point of the explosion. Apparently there had been a small accumulation of gas along the face at the end of this roadway. The machine had just finished an undercut along the face, and the portion in front of No. 3 roadway had been shot down and the loose coal was still lying there. The balance of the face was undercut and the cuttings thrown back in a heap at the face.

In the writer's opinion there had been a small accumulation of gas along the face at the head of No. 3 roadway and where the coal was shot down. On account of the coal which remained unshot there would be a projection which would hinder the air-current from reaching the portion which was shot down. This small accumulation of gas became ignited and travelled along the face, gathering up the finest of the coal-dust from the machine cuttings, and travelled down the airway on to the level and outwards for a distance of approximately 360 feet, or a distance of about 500 feet altogether from the point of origin. At this point the force had been expended.

At a point about 330 feet from the point of origin the surveyor's transit had been standing, and was knocked over and broken by the force of the blast and scattered a distance of 85 feet. The tool-sack which was lying on the floor, with hammers, etc., in it, was left undisturbed; a stopping was blown out by the concussion a distance of 600 feet from the point of origin. A man working about 1,000 feet away just felt a slight concussion, while another one claims he was knocked over; these men gave the alarm that something was wrong.

CAUSE OF IGNITION.

In the writer's opinion the gas was ignited by the flame of the carbide lamp carried by L. Murdock, who was following close on the heels of the fireboss going into the place. In No. 3 roadway the brushing was 14 feet from the face, and the safety-lamp carried by the fireboss was found 9 feet from the face of the brushing. Eighteen feet from the fireboss's lamp a carbide lamp was found which evidently had been carried by L. Murdock, judging from the position the bodies were found. Twenty feet farther back another safety-lamp was found, and 10 feet from this another carbide lamp was found; these had evidently been carried by Bertram, the chief surveyor in charge of the party. Ten feet outside of the carbide lamp carried by Bertram, another carbide lamp was found; this lamp had evidently been carried by Brough.

The bodies were all found in rotation as the lamps were found. Brough had moved about 120 feet from where he had dropped his lamp; Bertram had moved about 105 feet from where his lamp was found; Murdock had moved 80 feet away from his lamp, and Bobba 77 feet.

From the positions the bodies and lamps were found it would appear that the survey party had gone in this district, accompanied by the fireboss, to have a look around the places prior

to starting to survey. The position in which the lamps of the various members of the survey party were found would also indicate this. We found the fireboss's lamp nearest the face; his body is also nearest the point of ignition. Murdock's body is found next to the fireboss, with approximately the same distance between them as there was when they started to get out after the ignition had taken place. The other two bodies are practically the same, almost the same distance dividing them as there was before the accident. There was a small drill for drilling holes for the station plugs, found at the switch with the safety-lamp and carbide lamp; this had evidently been carried by Bertram. Murdock had evidently gone up the place to give Bertram a preliminary foresight for the station at the switch, and the fireboss had gone in ahead of him to examine the place, and not expecting anything to be in the place had allowed him to come in too close, and the flame from his lamp had come in contact with the outer edge of the accumulation of gas and ignited it. If it had not been for the dust from the machine-cutting it is improbable that the explosion would have extended any farther than the one place. The mine was damp at this point, and, in fact, throughout the whole mine; this accounts for the short distance the explosion travelled. Unfortunately the place had just been machine-cut the previous afternoon, and some of the dust from the cuttings was fine and dry enough to play a part in the explosion, and there is no doubt in my mind but what the dust propagated the explosion from its point of origin to where it stopped. Apart from the small amount of dust made at the face by the machine-cuttings, there was no material in this mine to feed an explosion; this accounts for the short distance the flame travelled.

VENTILATION.

The ventilation of the mine was good; there were 38,850 cubic feet a minute passing into the mine, and for the split where the accident occurred 15,750 cubic feet a minute. The conducting of this to the face might have been better, the pack-walls at the head of the roadways being a little too far back from the face, leaving too large an area, with a consequent reduction in velocity, thereby allowing a thin stratum of gas to accumulate along the roof at the face.

A little gas was reported in this section by D. Thompson, night-shift fireboss, in his reports of 7 a.m., May 23rd, May 27th, and May 29th, 1917. In cross-examination at the inquest this fireboss stated that the gas he reported on these three occasions was found at the highest place, and was not explosive gas, but simply a cap of gas. He also testified that he examined the section where the explosion occurred between 2 a.m. and 3 a.m. on the morning of the explosion and found it absolutely clear. While not being in a position to dispute this statement, a little reasoning will show that this is a strange occurrence.

Work finished on the long-wall face at 9 p.m. the night before the explosion, and from this fireboss's statements had stood for a period of six hours and no gas had accumulated. It is strange that after standing for this period, and remaining clear, gas should have accumulated between the hours of 3 a.m. and 10 a.m. unless some unusual occurrence had taken place on the face, which to all appearances had not.

OFFICIAL REPORTS.

These reports were made regularly and in correct form as far as the actual working-days were concerned, but for Sundays they are open for criticism.

It appears that on Saturday night the fireboss's work was to examine the doors, stoppings, and curtains to see that they were in good order. This left the Saturday night shift without a report for any men that might be coming to work in the mine on Sunday morning. This could have been remedied by sending out a fireboss earlier to have sufficient time to make the examination and report before the men went in the mine. It appears this was not done, Sunday being a small shift on repair-work; the firebosses on the morning shift would go and examine the particular places where these men were going to work, just before the men entered.

Technically this may have fulfilled the provisions of the "Coal-mines Regulation Act," but practically it was a poor system, and I am of the opinion it was a breach of their own special rules, No. 28 of which reads: "The fireboss on night shift shall begin to make his examination for the morning shift within three hours of the time the day shift enters the mine, and have it completed and be at the station to make and sign his report before the day shift enters the mine."

The defence was put up at the inquest by Mr. Mordy, overman at No. 6 mine, that there was no shift coming on duty on Sundays; therefore it was not necessary to have an examination and report made. When cross-examined by the writer he admitted there were twenty-four men at work exclusive of the surveyors, but including five firebosses this made a total of twenty-seven men in the mine; and he also admitted that under the circumstances that morning he would consider an examination necessary. There were plenty officials employed at the mine to carry out all provisions of the "Coal-mines Regulation Act" and special rules, but there seemed a laxity on the part of the manager and overman in not having this done on Sundays when men were working in the mine. It would have been a different matter if there had been no men going out to work in the mine. There might then have been some grounds for the statement that no examination was necessary.

INQUEST.

A Coroner's inquisition was held at Cumberland on June 6th and 7th, 1917, and after taking the evidence of eight witnesses the jury brought in the following verdict:—

"We, the jury empanelled to inquire into the death of George Norris Bertram, Frank Bobba, Lois Murdock, and John D. Brough at No. 6 mine, Cumberland, B.C., Canada, Sunday, 3rd day of June, 1917, are unanimously agreed that the above came to their death by an accidental explosion of gas in the Machine section. We also respectfully recommend that the use of naked lights in No. 6 mine of the Canadian Collieries (Dunsmuir), Limited, be entirely abolished.

"(Signed.) H. V. COLLINS, *Foreman*.

"JOHN PRAIN.

"JAMES E. ASTON.

"EDWARD LONGLAND.

"GEORGE JOHN HARDY.

"JOHN WILLIAMSON.

"JOSEPH SHAW, *Coroner*."

CONCLUDING REMARKS AND SUGGESTIONS.

The unfortunate loss of life in this case is to be regretted; in no case was the burning severe, or any other serious injuries, death being due to carbon-monoxide poisoning.

The accident was due purely and simply to naked lights. This accident could not have possibly occurred if safety-lamps had been in use. The mine was not gassy, neither was it dusty; it was just about as safe as any mine could be made from a gas and dust standpoint. It would therefore appear that naked lights are not safe in any coal-mine, and I would earnestly recommend that a clause be put in the "Coal-mines Regulation Act" prohibiting the use of naked lights in a coal-mine. This accident in all probability would not have occurred if it had been an ordinary working-day instead of Sunday, because in the event of it being a working-day the fireboss would have been in and examined the face for the oncoming shift within a short period of the men going in, and would have found the accumulation of gas and fenced the place off. Mr. Mordy, the overman of the mine, when cross-examined by the writer at the inquest, stated that when surveyors were going out on Sunday they usually reported to him, and he made arrangements for the examination of the places by the fireboss; and in this case the surveyor told him he would be down at the mine at 7 o'clock and see the fireboss himself, and he informed the surveyor the fireboss could go with them while they were making their survey. This the surveyor had evidently done, as he had been in the district on the other side of the shaft with the fireboss for that district and had completed his survey. He had evidently then gone into the other district and got Bobba, the fireboss, to go with them to examine the place. By an error of judgment on the part of Bobba, he had allowed these men to go in the places with him while he was making his examination, instead of keeping them at a point on the outside of the district until he had done so. Unfortunately he paid the extreme penalty for this error and sacrificed the lives of three men.

There was no lack of officials in the mine to make a thorough examination of the same, as there were five firebosses in the mine with nineteen workmen the morning of the explosion.

Appended to this report is a plan of location of accident, showing position of bodies found and general lines of explosive blast and direction of ventilating-current. Also analysis of samples of dust collected after explosion, and statement of injuries by the doctor.

SAMPLES OF COAL AND COKE TAKEN FROM NO. 6 MINE, CUMBERLAND, ON JUNE 4TH, 1917.

| | | Moisture. | Volatile Matter. | Fixed Carbon. | Ash. |
|----------------|---|-----------|------------------|---------------|-----------|
| | | Per Cent. | Per Cent. | Per Cent. | Per Cent. |
| Sample No. 1.. | Off end of cog at face of inside (No. 4) road..... | 1.2 | 25.3 | 42.9 | 30.6 |
| " 2.. | Off prop at head of No. 3 road | 1.3 | 23.6 | 49.7 | 25.4 |
| " 3.. | Off cog on No. 1 road, 40 feet from face on left side.. | 1.5 | 19.5 | 42.4 | 36.6 |
| " 4.. | Off cog immediately above No. 1 carbide lamp..... | 1.8 | 12.4 | 33.8 | 52.0 |
| " 5.. | Off (fault) cog 15 feet outside of fault | 1.3 | 18.1 | 40.1 | 40.5 |
| " 6.. | Off cog at bottom of No. 7 road | 1.2 | 22.3 | 44.3 | 32.2 |

DOCTOR'S CERTIFICATE.

My name is George Kerr McNaughton. I am a duly qualified medical practitioner in and for the Province of British Columbia. I reside at Cumberland.

About 1 p.m. on Sunday, June 3rd, I went down to No. 5 mine in company with T. Graham and Robt. Henderson, and straightway proceeded to that part of the mine where lay the bodies of the deceased, John D. Brough, Lewis Murdock, Frank Bobba, and George Bertram. I briefly examined the bodies in the order named, and in each case was unable to find any signs of life. The bodies were lying prostrate, and I noticed that the faces and hands were superficially burnt and that the covered parts of the bodies were still quite warm.

On Monday afternoon I made a closer examination of the bodies at Mr. Banks's undertaking parlours, and found as follows:—

John D. Brough.—Hair on scalp and eyebrows burnt close to skin; burns of first and second degree of face, scalp, neck, hands, wrists, and both sides of trunk; third degree burn of the nose.

Lewis Murdock.—Hair singed on back and sides of neck, not singed at all on top of head; eyebrows burned close to skin; burns of first and second degree of face, backs of hands, and wrists; first degree burns of upper part of chest.

Frank Bobba.—Hair singed all over scalp; eyebrows burned close to skin, but eyelashes only slightly singed; burns of first and second degree of forehead, face, hands, and wrists.

George Bertram.—Hair singed all over scalp; in front half-burned close to skin; eyebrows burned; first and second degree burns of the forehead, face, hands, and wrists, and upper part of both shins.

In all cases the superficial layer of skin in the burnt areas was charred and blackened. Where the deep layer of skin was exposed it was a cherry-red colour, and in the different parts of the body the healthy skin assumed a fresh pink colour in contrast to the usual dusky purple.

Apart from the burns there was no evidence of external injury. From the nature of the accident and the examination of the bodies I believe the death of deceased, Brough, Murdock, Bobba, and Bertram, was caused from poisoning by carbon-monoxide gas.

VICTORIA, B.C.:

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1918.





Coal Creek Colliery, South Side.



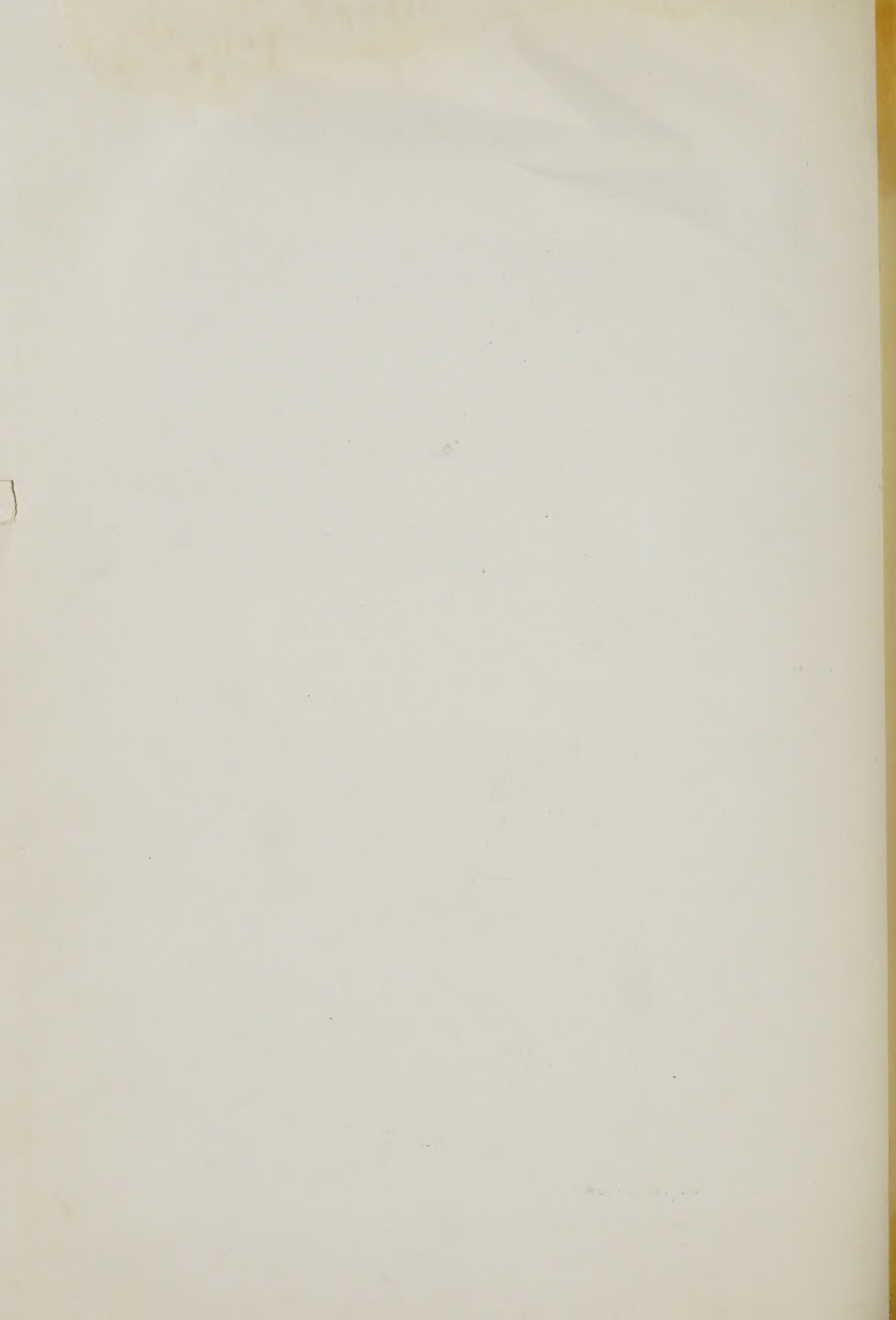
Entry, No. 3 Mine Slope, from West.



Entry, No. 3 Mine, Coal Creek, after explosion.



Entrance to Travelling-road, No. 3 Mine, Coal Creek.



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